JOURNAL

OF THE

American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

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A VALUABLE COMMITTEE

In the long list of committees of the A. V. M. A. there is one that is relatively new, but during the few years of its existence it has rendered a very good account of itself. We refer to the Committee on Proprietary Pharmaceuticals. Working under heavy handicaps, such as limited funds, the members scattered in widely separated parts of the country, with no laboratory facilities for making chemical analyses of the patent remedies and cure-alls brought to their attention, and with only a fractional part of their time available for the work, the Committee has already justified its existence many times over, even though progress has seemed slow at times, for the reasons given.

Valuable contacts have been established, as a result of which the veterinary profession in general and the American Veterinary Medical Association in particular have been brought into prominence in places where we have had little or no influence heretofore. Even though the work that the Committee has been doing has been done quietly and with little publicity, as recently pointed out by the Chairman, Dr. H. D. Bergman, the existence of the Committee is becoming widely known and recognized, indicated by the ever-increasing number of letters being received from all parts of the country, written by parties who have been referred to the Committee for help of one kind or another.

Two of the most valuable contacts developed by the Committee are the Food, Drug and Insecticide Administration, of

the U. S. Department of Agriculture, and the Federal Trade Commission. The former has been very actively engaged in a campaign to clean up the "patent remedy" evil which has been allowed to run wild up until a relatively short time ago. The F. D. and I. Administration has centered its activities around the claims made for these nostrums on the labels of the true containers, as well as the proprietary names of these preparations, particularly those implying that the products are remedies or cures for this, that or the other disease.

The activities of the Federal Trade Commission cover another phase of the nostrum industry, namely, the trade practices, the sales methods, or the actual merchandising of these preparations, including statements and claims made either in advertising matter or by salesmen or detailists. Both the Food, Drug and Insecticide Administration and the Federal Trade Commission frequently need expert opinions on the merits, or lack of merit, of a certain preparation, usually one that is being marketed with rather strong claims. It is here that the A. V. M. A. Committee on Proprietary Pharmaceuticals comes in, to play the role of consultant. The personnel of the Committee is such that opinions rendered by the Committee carry a great deal of weight and are eagerly sought for by the governmental agencies above named.

Just one more phase of the Committee's work will be mentioned here. Publishers of the better class of farm papers have shown a marked disposition lately to clean up their advertising columns and exclude advertisements of questionable articles, particularly the patent remedies under discussion. Here again our Committee gets into action in an advisory capacity, whenever consulted on one of these questions, which has been rather frequently of late.

Eventually the work of the Committee should be headed up in the A. V. M. A. offices, with the chairman a full-time employe of the Association, with the necessary laboratory facilities available for carrying on the work, after the fashion of the Council on Pharmacy and Chemistry of the American Medical Association. It will come sooner or later.

CASE REPORTS

Favorable comments are being received on the increasing number of clinical and case reports appearing in each issue of the JOURNAL. The fact that we are not averse to spending money on cuts to illustrate these reports has not passed unnoticed.

Nobody knows any better than the Editor that our members like to read these short, concise articles dealing with unusual and interesting cases encountered in the field, the clinic and the laboratory. This particular department of the JOURNAL is the only one that is hard to keep filled all the time. We could use twice as much of this kind of material as we receive. Getting it is the difficult part. Putting it into print presents no particular problem. Any rewriting that is necessary is willingly done by the Editor.

Hundreds, probably thousands, of interesting cases are presented each year at the clinics maintained by our thirteen veterinary colleges in the United States and Canada. How many of these are ever written up for publication? Comparatively few. Would it not be a good idea to require each senior student to write up one case report for publication, as a requirement for graduation? Get our oncoming veterinarians into the habit of keeping records of their cases and occasionally writing up a report of a case, or a series of cases, for publication in one of the veterinary journals. If all senior students were required to do this, and these reports were divided among the three monthly veterinary journals there would be available about five reports for each issue of all three journals for the next year.

Here is something for our veterinary deans to think about.

INTERNATIONAL VETERINARY CONGRESS

As previously announced from time to time, the eleventh International Veterinary Congress will convene in London, August 4-9, 1930.

The object of these congresses is the advancement of the science and practice of veterinary medicine and surgery. To this end discussions are arranged on what are considered to be the most important scientific and practical questions of the day, with a view to their solution by an interchange of opinions and personal experience.

A permanent committee, with headquarters at The Hague, forms a connecting link between successive congresses and decides the programs of meetings. On this committee eminent veterinarians chosen from the principal countries in the world serve as members. The Organizing Committee of the 11th Congress is composed of representative British veterinarians, with Sir John M'Fadyean as President and Dr. F. Bullock as General Secretary.

Dr. L. Van Es, of Lincoln, Nebr., represents the United States on the Permanent Committee and Dr. George Hilton, of Ottawa, Ont., performs the same function for the Dominion of Canada.

According to a preliminary announcement of the 11th Congress, there will be six general meetings. These will be devoted to the following subjects:

1. Foot-and-Mouth Disease (Plurality of Viruses, Immunization, Disinfection).
2. Tuberculosis (Vaccination).
3. Infectious Abortion of Cattle, Sheep and Swine.
4. The Relationship of the Veterinary Surgeon to Animal Husbandry.
5. Veterinary Science in Relation to Public Health, with Special Reference to Production and Distribution of (a) Meat and (b) Milk.
6. The Law Governing the Practice of Veterinary Medicine and Surgery.

Dr. E. A. Watson, of Ottawa, Ont., is listed as one of the reporters on tuberculosis and similarly Dr. W. E. Cotton, of Washington, D. C., is listed for infectious abortion.

Sectional meetings have been arranged as follows:

I. Pathology, Bacteriology and Epizootiology.
II. Veterinary Medicine, Surgery and Obstetrics.
III. Tropical Diseases.
IV. Poultry Diseases.
V. Zootechny and Dietetics.

In Section I, Dr. M. Dorset, of Washington, D. C., is listed as a reporter on swine fever (hog cholera). Drs. Adolph Eichhorn, of Pearl River, N. Y., and J. R. Mohler, of Washington, D. C., are included among the reporters on standardization of biological products.

Dr. M. C. Hall, of Washington, D. C., will report on the use of drugs in the treatment of diseases caused by nematode and trematode worms. Dr. P. A. Fish, of Ithaca, N. Y., will report on milk fever. Dr. R. L. Conklin, of Macdonald College, Que., is scheduled to report on bovine sterility. Dr. L. Van Es, of Lincoln, Nebr., is listed for diseases of the new-born. Dr. K. F. Meyer, of San Francisco, Calif., will report on theileriases.

Dr. J. R. Beach, of Berkeley, Calif., will be one of the reporters on fowl-pox and coryza, and similarly Dr. F. R. Beaudette, of New Brunswick, N. J., will cover fowl typhoid and bacillary white diarrhea. Dr. George H. Hart, of Davis, Calif., is listed as one of the reporters on scientific feeding of animals.

Quite a number of social functions and excursions have been arranged in connection with the Congress. The excursions will take place during the week following the Congress, that is from

August 11 to 16, and these will in some cases occupy one day, some two days, and others the whole week at the choice of the members.

Membership in the Congress costs 30 shillings and each member will be entitled to receive a copy of the printed report, as well as of the general report published after the conclusion of the Congress. The cost of the report to non-members will be 30 shillings. Veterinary students may join the Congress as extraordinary members and the membership fee for students is 10 shillings.

SOME RECENT HISTORY ON ABORTION VACCINE

At the Detroit meeting of the American Veterinary Medical Association, the Committee on Abortion brought in a report which, among others, contained the following recommendation:

> Your Committee believes the distribution and use of vaccine made from living *Bacterium abortus* organisms which are virulent or which may become virulent is a dangerous procedure. This is stated, not only because of its relation to the control of the infection in cattle and other species of live stock, but because of the possibility of the transmission of the infection to human beings.

At the same meeting, a paper, entitled, "The Pathogenicity of Abortion Vaccine for Guinea Pigs," was presented by J. P. Torrey and E. T. Hallman, of Michigan State College. In this paper the investigators reported that they had studied nine commercial abortion vaccines for viability and virulence. The following statement was included in the summary of the paper:

> Abortion vaccines from nine manufacturers were studied for viability and virulence. Of these our cultural data indicate that three were nonviable although tested 20, 72 and 76 days, respectively, before the expiration dates stamped on labels. The fourth failed to grow except for a few colonies on carbol-fuchsin agar, indicating that the vaccine contained a few viable organisms. The virulence tests with two of these four indicate that they contained a few viable virulent organisms. The five remaining vaccines were viable. Two of these appear to be highly attenuated but not non-virulent. One of the two apparently attenuated vaccines has been shown to consist of organisms possessing the property of acquiring considerable virulence when subjected to favorable conditions for the organisms. Three vaccines showed more virulence for guinea pigs than many recently isolated strains from aborting cattle.

At the special meeting of the Executive Board of the American Veterinary Medical Association, held in Chicago, December 4, 1929, the question of the propriety of admitting advertisements of living organism abortion vaccines to the JOURNAL was discussed at considerable length. It was pointed out that the Association was being criticised for maintaining an inconsistent position in condemning the use of these products and at the same

time allowing them to be advertised in the JOURNAL. As a result of the discussion, a motion prevailed to allow no advertisements of the product to appear in the JOURNAL, until decided otherwise.

At the 1929 meeting of the United States Live Stock Sanitary Association, the Committee on Abortion of that organization brought in a report which, among other things, contained the following statement relative to living organism abortion vaccines:

> Your Committee desires to state that the use of living vaccines which are virulent or which may become virulent is a dangerous procedure. We recommend that their distribution be prohibited. This is stated, not only because of the relation of the use of these products to the control of the infection in cattle and other species of live stock, but because of the added danger of the transmission of the infection to human beings by their use. We do not imply by this that vaccination as a method for the control of Bang's disease is not worthy of study. We do state most emphatically, however, that it is still in the experimental stage and should be kept under close supervision of competent research specialists.

At a meeting of the California Committee for the Study of Bacillus Abortus Infection, held on January 10, 1930, a motion was passed authorizing the Secretary to formulate a statement to the effect that the members of the Committee endorsed the action of the American Veterinary Medical Association and unqualifiedly condemned the use of living abortus vaccine.

Under date of March 1, the Cutter Laboratory, of Berkeley, Calif., mailed a letter to veterinarians throughout the country, announcing that they had decided to discontinue further production of Bacillus Abortus Vaccine (living). This announcement went on to state as follows:

> We hope that those who do not agree with the opinion of the A. V. M. A., or the California Committee, or our action in discontinuing production and sale of living Bacillus abortus vaccine, will realize that this action was not of our own choice, but was dictated by the best interests of public health.

The JOURNAL will be glad to give a similar amount of space to the publication of announcements of other biological houses to the effect that they have discontinued the manufacture and sale of living organism abortion vaccine, if such action is brought to our attention.

PLANS FOR LOS ANGELES

California veterinarians are busily engaged with their plans for entertaining the A. V. M. A. in Los Angeles, this summer. The dates for the convention have been officially fixed for August 26-27-28-29. We are advised that the official headquarters will be at the Ambassador Hotel.

The Local Committee on Arrangements is headed by Dr. L. M. Hurt, whom many of our members had the pleasure of meeting at the Detroit convention last summer. Dr. E. E. Jones is secretary of the Committee. The various subcommittees are headed as follows:

Alumni Meetings—Dr. R. E. Duckworth, Los Angeles.
Banquet—Dr. E. E. Jones, Los Angeles.
Clinics—Dr. C. A. White, Hollywood.
Exhibits—Dr. G. W. Blanche, Glendale.
Finances—Dr. W. L. Curtis, Los Angeles.
Hotels—Dr. M. Rosenberger, Reseda.
Membership and Attendance—Dr. L. E. Pike, Long Beach.
Press and Publicity—Dr. J. P. Bushong, Los Angeles.
Reception and Entertainment—Dr. P. C. Guyselman, Fontana.
Registration—Dr. J. L. Tyler, Pomona.
Transportation—Dr. W. R. Carr, Los Angeles.

The Chicago & Northwestern and Union Pacific railroads have been designated as the official route from Chicago to Los Angeles, and plans are being perfected for organizing a party to occupy special cars on the Los Angeles Limited, leaving Chicago, Thursday evening, August 21, and arriving in Los Angeles, Sunday evening, August 24, with a stop-over in Salt Lake City on Saturday. Details are to be found in the announcement in the advertising section of this issue. Note also the announcement of the Panama Pacific Line, directing attention to the desirability of returning eastward by water via the Panama Canal, a particularly delightful trip at that time of the year.

Weber Canyon, Utah, on the Union Pacific System

APPLICATIONS FOR MEMBERSHIP

(See January, 1930, JOURNAL)

FIRST LISTING

DAVIS, L. BLAKE — Box 1, Clementon, N. J.
V. M. D., University of Pennsylvania, 1912
Vouchers: J. B. Hagenbuch, Jr. and J. G. Hardenbergh.

HARNER, JAMES W. — Canaan, Vt.
B. S., Kansas State Agricultural College, 1900
D. V. M., Kansas State Agricultural College, 1909
Vouchers: L. H. Adams and R. R. Dykstra.

LEGARD, HENRY MELDRUM — 335 Main St. N., Weston, Ont.
V. S. B. V. Sc., Ontatio Veterinary College, 1923
Vouchers: C. D. McGilvray and R. A. McIntosh.

LIETZMAN, LUNA O. — 121 S. Washington Ave., Whittier, Calif.
D. V. M., Indiana Veterinary College, 1924
Vouchers: W. L. Curtis and John L. Tyler.

LOFTUS, JULE BERT — Pathology Dept., Colo. Agr. College, Ft. Collins, Colo.
D. V. M., Colorado Agricultural College, 1929
Vouchers: Geo. H. Glover and I. E. Newsom.

McDONALD, W. A. — 312 Gazette Bldg., Little Rock, Ark.
D. V. M., Kansas City Veterinary College, 1912
Vouchers: Joe H. Bux and W. C. Glockner.

WILCOX, ADELBERT EDWIN — Hyannis, Nebr.
D. V. M., St. Joseph Veterinary College, 1923
Vouchers: Bernhard Witt and C. H. Hays.

Applications Pending

SECOND LISTING

Brown, James Arthur, 315 Long St., Aberdeen, Miss.
Clark, Joseph Stanley, Box 423, St. Joseph, Mo.
Cowser, Albert Roscoe, Farmington, Ill.
Fischer, Fred F., 43 W. North St., Galesburg, Ill.
Gray, H. J., Kirklin, Ind.
Greer, Joseph E., Box 291, Lexington, Miss.
Hall, Charles George, 184 Longwood Ave., Boston, Mass.
Harrison, Wilfred F., R. D. No. 1, Stockton, N. J.
Hiett, Allen A., 1514 Aster Place, Cincinnati, Ohio.
Howard, John Ellis, 17204 John R., Detroit, Mich.
Isbell, R. G., Box 273, Gadsden, Ala.
Jowers, Judson M., Seman, Ala.
Kneup, Fred G., 148 W. 72nd St., Cincinnati, Ohio.
Krill, Walter R., Vet. Clinic, Ohio State Univ., Columbus, Ohio.
LeGore, Harlow P., Box 635, Minot, N. Dak.
Loffer, S. Frank, Imperial, Calif.
Moorman, Chauncey E., 127 Montclair Ave., Westview, Pittsburgh, Pa.
Powell, L. L., Whynot, Miss.
Spalding, Norman Curtice, Provo, Utah.
Stringer, Nathan I., Wenona, Ill.
Taberner, Francisco R., 412 N. 11th St., Manhattan, Kans.
Varble, Perry L., 707 W. Washington St., Bloomington, Ill.
Walkerdine, Sidney Henry George, 616 Mission Blvd., R. 6, West Riverside, Calif.

The amount which shall accompany an application filed this month is $8.75 which covers membership fee and dues to January 1, 1931, including subscription to the JOURNAL.

COMING VETERINARY MEETINGS

San Diego-Imperial Veterinary Medical Association. San Diego, Calif. April 2, 1930. Dr. A. P. Immenschuh, Secretary, Santee, Calif.

Kansas City Association of Veterinarians. New Baltimore Hotel, Kansas City, Mo. April 8, 1930. Dr. J. D. Ray, Secretary, 400 New Centre Bldg., Kansas City, Mo.

Chicago Veterinary Medical Association. Atlantic Hotel, Chicago, Ill. April 8, 1930. Dr. J. B. Jaffray, Secretary, 2956 Washington Blvd., Chicago, Ill.

New York City, Veterinary Medical Association of. Academy of Medicine, 5th Ave. and 103rd St., New York, N. Y. April 9, 1930. Dr. John E. Crawford, Secretary, 708 Beach 19th St., Far Rockaway, Long Island, N. Y.

Southeastern Michigan Veterinary Medical Association. Detroit, Mich. April 9, 1930. Dr. H. Preston Hoskins, Secretary, 716 Book Bldg., Detroit, Mich.

Maine Veterinary Medical Association. Bangor, Me. April 9, 1930. Dr. L. E. Maddocks, Secretary, R. F. D. 2, Augusta, Me.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. April 16, 1920. Dr. W. L. Curtis, Secretary, 1264 W. 2nd St., Los Angeles, Calif.

Keystone Veterinary Medical Association. Philadelphia, Pa. April 23, 1930. Dr. C. S. Rockwell, Secretary, 5225 Spruce St., Philadelphia, Pa.

Michigan-Ohio Veterinary Medical Association. Adrian, Mich. April 24, 1930. Dr. E. C. W. Schubel, Secretary, Blissfield, Mich.

Midwestern States Tuberculosis Conference. Cedar Rapids, Iowa. April 29-30, 1930. Dr. John B. Bryant, Mt. Vernon, Iowa.

Arkansas Veterinary Association. Marion Hotel, Little Rock, Ark. May 5-6, 1930. Dr. W. A. McDonald, Secretary, 312 Gazette Bldg., Little Rock, Ark.

Southwestern Tuberculosis Conference. Marion Hotel, Little Rock, Ark. May 5-6, 1930. Dr. H. L. Fry, Secretary-Treasurer, 3-4 War Memorial Bldg., Nashville, Tenn.

BANG DISEASE CONTROL WORK IN FOURTEEN STATE INSTITUTION HERDS*

By B. Scott Fritz *and* M. F. Barnes

Pennsylvania Bureau of Animal Industry,
Harrisburg, Pennsylvania

In the state of Pennsylvania there are seventeen state institutions, three of which are being developed. The fourteen others have farms upon which live stock and poultry are maintained and it is these in which we are particularly interested. These fourteen institutions have 21,266 acres of land, of which 10,453 are under cultivation. This represents a larger acreage than is to be found in the average Pennsylvania township. The Commonwealth may justly be called the largest operator in the State.

The live stock and poultry at these institutions have an approximate value of one-half million dollars. There are 1500 cattle, the value of which is estimated at $250,000. This estimated value of the cattle is placed very low and they would most likely sell for double the amount given.

The institutions are classified as: five penal and correction; four schools for feeble-minded and epileptics and eight mental hospitals.

The dairy herds of these institutions are as a group supervised by the Pennsylvania Department of Welfare. The Pennsylvania Bureau of Animal Industry supervises the control of transmissible animal diseases.

All but one of the fourteen herds are made up of grade and pure-bred Holsteins. Several do not have the necessary number of producing cows, based upon the land cultivated and the population of the institutions. In all except two, the management is that of a dairyman with the supervision of a general farm manager who is responsible to the superintendent of the institution. Patients or prisoners are used as milkers and helpers.

The problems of prevention, control and suppression of animal and poultry diseases receive major consideration. The live stock from which a profit is desired has a value in connection with occupational therapy. The management appreciates the importance of health and is particularly concerned in having live stock and poultry free from diseases communicable to man.

*Presented at the sixty-sixth annual meeting of the American Veterinary Medical Association, Detroit, Mich., August 13-16, 1929.

All live stock is maintained under recommended systems of sanitation. Buildings and equipment are modern, other than a few of which are old and inadequate for the number of live stock. Many of these buildings, however, have not been designed for the expedient prevention, control or suppression of transmissible animal diseases.

The Bureau is primarily interested in transmissible diseases, but does not overlook the value of the services of the practicing veterinarian to these institutions, in connection with other diseases, and his services are also of value in maintaining a high standard of health, through cooperation with the Bureau.

All of these herds have been free from tuberculosis for a considerable period of time, due to tuberculosis-suppression measures which were carried out a number of years ago. One of the problems now confronting both the practicing veterinarian and the Bureau is to prevent a re-introduction of that disease.

A different situation exists in these herds than in privately owned herds. Institutions do not sell or trade live stock or farm products. No profit is available except as utilized. This does not encourage an incentive for building efficient herds and the incentive which exists is competitive. These farms, being located throughout the State, are of value to their communities, when maintained in a creditable manner.

A health survey was made in the fourteen institution herds in June, 1925. This survey indicated the presence of Bang disease. It was deemed advisable, due to the economic importance of Bang disease suppression, to take immediate steps for its control.

In several of the herds surveyed, a diagnostic test for the presence of Bang disease had been made several years prior to 1925, although little had been done to control the infection. It was thought most likely that the disease had steadily progressed, as was indicated by the number of abortions which had occurred annually in some of the herds.

The first institution herd test for Bang disease following the survey, was made in June, 1925. The remaining herds were tested as time permitted, and testing had been done in practically all the institution herds within one year after the date of the first complete herd test. As soon as the laboratory report of each initial test had been received, the institution was urged to adopt a definite plan. Only two of them adopted the Pennsylvania Plan in its entirety at the outset of the work, and the results they

obtained were as encouraging as those previously experienced in privately owned herds.

Some of the institutions in the beginning did not have facilities for isolating positive animals and the positive animals in most of these herds were for a time separated in one end of the main dairy barn, or, where there were different sections in the barn, they were placed in one of the sections.

Each institution required a specified amount of milk and if the milk supply of the herd were to be reduced by disposal for slaughter of the reacting animals, no other source of supply, or money to procure milk for the institution's need was available. Therefore, the adoption of a method which was an approach to the Pennsylvania Plan was imperative. This method lacked in an important principle—by permitting contact of the infected and susceptible animals.

The feasible program of raising offspring from both negative and positive animals was adopted. These animals were kept separated and protected until they reached maturity, when they were used as replacements as soon as the institution was prepared to slaughter the positive animals. This method worked to partial satisfaction with careful management and sanitation. However, a fair percentage of the young cattle became infected soon after they were placed in contact with the infected animals, or from being added before the infection in the mature group had been completely suppressed. This method was helpful in eventually reaching that stage when a sufficient amount of milk was being produced to meet the needs of the institution, and the nonprofitable positive animals could be slaughtered. The results in herds that followed this method furnish evidence of the economy of completely isolating the positive animals, from the first inception of a program toward suppression of this disease. The infected animals in these herds were not profitable and were a menace to the healthy animals.

Obstacles

The control and suppression of transmissible animal diseases in state institutions is sometimes more difficult to accomplish than in privately owned herds, even when there are equal desires toward that end. The responsibility of carrying out any definite program with an institution is divided among a number of people; more than the average number of animals are involved; there is considerable traffic in and through the stables; laborers are

mental patients; buildings, equipment, materials, and other facilities sometimes are limited; the management sometimes is reluctant to accept additional responsibilities and duties on account of the class of labor upon which it is dependent.

Other obstacles are: The barns and premises are visited by a great many people yearly. The visitors, many of whom are farmers and dairymen, are hazards in that the present-day mode of travel permits one to step from his infected premise to an automobile, with infectious material on his shoes, travel many miles in a short time, alight from the automobile, take but a few steps and deposit the infectious material within a barn from which an attempt is being made to eradicate infection. It is believed that some re-infections in these herds have been introduced by this means. In one herd, reactors were found within the entrance of barn 1, through which all visitors pass before being taken through the other barns, and the infection could be accounted for in no other way. After several experiences of this kind, barriers were constructed to prevent their recurrence.

The patient-labor made use of at the institutions is difficult to manage. Shovels, brooms, forks, etc., have been painted various colors, with the hope that they could thereby be designated for specific uses. However, all such attempts have been of no avail.

These few statements are made with the hope of clarifying the point, that a Bang disease program may be successfully carried out and the practicing veterinarians should not hesitate to recommend a definite plan to stock-owners in time to prevent losses or even after they are experiencing losses from this disease.

At the outset of our program in these fourteen herds, it became necessary first to show the institutions (the superintendent, steward and board of directors, farm managers and dairymen) that they were in need of a definite program for the control of Bang disease in their dairy herds. The herds had been managed by fairly capable farm managers and dairymen. Each of these accepted the percentage of losses occurring annually from this disease, and although these losses in some instances reached high proportions, nothing was being done to overcome them, and it was only after a number of the institutions had been shown the comparative results, computed in dollars, of milk and calf production in the Bang disease-free herds compared with the infected herds, that the management became interested. From this time on, progress was made in those herds in which little had been made previously.

The herds that adopted a definite plan and adhered to it made rapid progress, while the others had been segregating their infected animals from the non-infected group in the same dairy barn. No use was made of maternity stalls, even when available. A number of the institutions have recently built suitable maternity stalls.

The partial adoption of the Plan seemed to be helpful, as from the time segregation of the infected from non-infected animals was practiced, the number of abortions was materially reduced in the worst infected herds. Animals of doubtful breeding were removed regularly, and in some herds the reactors were not rebred after they once became positive but were kept in the milking-line for the milk they could produce until such time as the institution saw fit to have them slaughtered.

The nature of the infection in the different herds has varied in virulence, progress and extent. At the time of the initial test some herds were experiencing what would be known commonly as active outbreaks, that is, they experienced more than the usual number of abortions and other clinical herd manifestations of the disease.

In demonstration of some of the conditions to which previous reference has been made, the milk and calf production records are partly given for some herds. One or two herds are deserving of special mention.

HERD A

A blood test applied in 1924 to 70 head of mature animals in herd A revealed 49 per cent infection. The reacting animals were placed on one side of the stable and slaughtered as they became unprofitable in the production of milk and calves. No definite plan for controlling the infection was attempted. In 1927, 70 head were again blood-tested, revealing 30 per cent infection, which did not include the animals in the above 49 per cent. Between the years 1924 and 1927, a number of blood tests were made and additional reactors were found on each test and were placed on the side of the barn with the previous reactors to be milked out and slaughtered. Only a limited number of the reacting animals were rebred. At the time of the 1927 test, the management had become convinced that but limited profit was available from the infected group. The herd had experienced a comparatively large number of abortions previous to the 1927

test. Seven abortions were recorded in one week and 22 occurred in approximately four months.

The infection seemed to be highly virulent and the cows became quite sick after aborting, had high temperatures, refused to eat, and had a very fetid discharge from the uterus. Many of the reacting cows became emaciated and some died. In others, sterility and mastitis followed. Those that recovered, after two weeks to a month of sickness, produced very little milk during that lactation period. Many of them lost all or portions of their udders. To maintain the milk supply, the institution had purchased twelve animals from a Bang disease-free herd. Sixteen days after the free cattle were added, a blood test was made and two of the added cattle reacted. All of the added cattle were in milk and the service records indicated all of them to be two to six months pregnant. In approximately three months, the twelve added cattle had become reactors and seven of them had aborted. An agglutination blood test on 81 head February 8, 1928, revealed 21 per cent additional infection.

The disease, along with other secondary infections, had now reached such proportion that the milk supply was dwindling and a serious problem confronted the management in meeting the milk demands of the institution. They had now become so thoroughly convinced that full authority was vested in the Pennsylvania Bureau of Animal Industry to save the remaining cattle. Another blood test, applied February 19, 1928, to 40 mature animals, revealed no reactors. The following test, March 28, 1928, on 76 head, revealed eight positive and one highly suspicious, or 10.5 per cent infection. Thereafter tests were made at two to three weeks to monthly intervals and no reactors have been found in the herd since the test of March 28, 1928, but females were placed in isolated stalls several weeks before freshening and were not returned to the main herd unless negative at least two weeks subsequent to calving. By this procedure six additional positive animals were found which could have gotten back into the herd and spread infection. However, as they were handled, these animals were removed to another farm, never to be returned. The herd has been rigidly culled for production and, due to this fact, fewer animals are producing more milk.

The Official Cow Testing Association records on this herd show for the month of September, 1929, 34 cows averaged 844.5 pounds of milk, as compared with the same month of 1927, when 53

cows averaged 659.5 pounds of milk; a difference of 185 pounds (21.7 per cent), or an increase of 28 per cent. A number of our herds have made equally as phenomenal recoveries in production after reducing the infection from a high to a low percentage and removing unprofitable animals. All indications are that herd MOR is free from infection.

One month's milk-production in herd A

	Cattle	*Average Production*
Sept. 1929 (no reactors)	34	844 lbs.
Sept. 1927 (reactors in herd)	53	659 lbs.
Difference	185 lbs. (22%)	
Increased average (1927 to 1929)	185 lbs. (28%)	

HERD B

Herd B is made up of high milk-producing individuals and the herd is considered among the highest milk-producing state institution herds in the State.

A report made from a close study of the herd records, which are accurately kept, shows for a five-year period, from 1922 to 1926, the following milk-production record (table I).

TABLE I—*Yearly milk-production for a five-year period*

YEAR	AVERAGE NUMBER OF COWS	AVERAGE PRODUCTION (LBS.)
1922	112	10,539
1923	107	10,914
1924	96	11,359
1925	94	9,420
1926	91	8,860

The average number of cows was obtained after adding the number of dry cows to those actually producing and the years given were for a twelve-month period ending May 31 of each year.

The report indicates that the decreased milk-production was due to Bang disease, which started in the herd in November, 1922, and abortions occurred in the herd as shown in table II.

TABLE II—*Abortions (1923 to 1926)*

YEAR ENDING	ABORTIONS
May 31, 1923	14
May 31, 1924	27
May 31, 1925	20
May 31, 1926	9

Table II would seem to indicate that the peak for this period was reached during the year ending May 31, 1924, and the result is shown in a decreased milk-production during the years ending May 31, 1925, and May 31, 1926. In 1925, the average production was 17 per cent less than the year previous, and in 1926 it was 22 per cent less. It is stated in the report that the size of the herd was reduced from 1924 to 1926, due to loss through sterility.

The Cow Testing Association summary shows that 88 cows during the period March, 1923, to February, 1924, inclusive, produced an average of 12,260 pounds of milk and 404 pounds of butter fat which were stated to be the highest averages in any Pennsylvania cow testing association for a herd of this size.

The report contained a few of the individual Advanced Registry semi-official records which are shown in table III.

TABLE III—*Some individual advanced registry semi-official records*

	AGE (YRS.)	MILK (LBS.)	BUTTER (LBS.)
A	9	23,490	1096.47
B	3	20,114	828.02
C	6	21,634	877.43
D	4	21,712	952.71
E	5	20,229	839.62

Since the low number of abortions shown in the year ending May 31, 1926, the disease has reached another peak, as indicated by clinical manifestations and blood-testing. Testing was started during an active outbreak and the initial test showed 36 per cent reactors. For a time after testing was begun, the Plan was only partially carried out and consequently, due to the high virulence of the infection, rather slow progress was made in the elimination of the disease from the herd. Tests however were made quite regularly and an opportunity was furnished for making a comparative study of milk-production records in both the reacting and negative groups.

In order to shorten our report and prevent the use of too many confusing figures by giving the production of one cow for two years, another for three, another for one and so on, the total number of milking-years furnished by the different groups for the periods studied is, for determining the average production, taken to represent the number of cows. For example, three cows for two years, four cows for three years and two cows for one

year show twenty years' production, and, therefore, are equivalent to one cow for twenty years, or twenty cows for one year, and this is the basis upon which the following statements are made.

The entire herd of 164 cows in 297 years produced a total of 3,500,442 pounds of milk, or an average of 11,813 pounds per year.

One hundred and four negative cows in 198 years produced a total of 2,602,415 pounds of milk, or an average of 13,143 pounds, which is an average of 1,330 pounds more than the average for the entire herd and an average of 3,705 pounds more than the average for the positive cows.

Sixty positive cows in 96 years produced a total of 906,027 pounds of milk, or an average of 9,438, which is 3,705 pounds per year less than the negative group and 2,405 pounds less than the average yearly production of the entire herd.

TABLE IV—*Positives compared*

	POUNDS MILK	DOLLARS
Less than herd average	2,405	95.00
Less than negative average	3,705	148.20

Figured at four cents per pound, the average yearly production of the negative group is worth $525.72; the entire herd average is worth $472.52, or $53.20 less than the negatives; the positive group average is worth $377.52, or $148.20 less than the negatives and $95.00 less than the average for the entire herd. The average production of the positives was 28 per cent less than the average of the negatives.

We consider these comparative differences as representative figures for virulently and extensively infected herds.

TABLE V—*Milk-production period of 1927-1928*

	COWS	YEARS	TOTAL PRODUCTION (LBS.)	AVERAGE PRODUCTION (LBS.)	AVERAGE VALUE AT 4¢ PER LB.
Negative group	104	198	2,602,415	13,143	$525.72
Positive group	60	96	906,027	9,438	377.52
Entire herd	164	294	3,500,442	11,813	472.52

Note: Average yearly production of positive group was 28 per cent less than the negative group.

Eighteen cows furnished 26 milking-years before they became positive and 26 milk-producing years after becoming positive. The production records are shown in table VI.

TABLE VI—*Eighteen cows furnished 26 milk-producing years before becoming positive to the blood test and 26 milk-producing years after becoming positive*

	AVERAGE PRODUCTION (LBS.)	VALUE (@ 4¢)
Before Positive	13,012	$520.48
After Positive	7,516	300.64
Difference (42%)	5,496	$219.84

In the 26 milking-years as positive animals, there were eleven abortions (42 per cent). The eleven abortions occurred in seven of the eighteen positive cows (39 per cent).

HERD C

This is a grade herd. The first test was made in August, 1925, when there were 21.6 per cent reactors out of 34 animals tested. Following the initial test, no reactors were found until February of 1927, when one positive and one highly suspicious animal was disclosed. These two animals became infected as a result of being placed on a separate part of the farm in a barn previously occupied by reactors. They were removed from the herd immediately. The premise was thoroughly cleaned and disinfected and subsequent tests have been negative.

This herd was certified Bang Disease Free in June, 1928, on 48 cattle and the certificate was renewed July, 1929, on 56 cattle. This is not a high-producing herd. Twenty-eight cows in 33 producing years produced 33 calves and an average of 7,490 pounds of milk per year.

HERD D

This is a grade herd. Eighty-eight negative animals in 147 milking years produced a total of 906,216 pounds of milk or an average of 6,165 and 145 calves which included three sets of twins. Only one abortion occurred and it was not due to Bang disease.

TABLE VII—*Summary of herd D*

	COWS	YEARS	TOTAL MILK (LBS.)	AVERAGE MILK (LBS.)	TOTAL CALVES	AVERAGE CALVES
Negatives	88	147	906,216	6,165	145	1
Positives	40	70	360,775	5,153	33	½
Difference				1,012 lbs. (16+%)		½ (50%)

Forty reactors in 70 producing years produced a total of 360,775 pounds of milk or an average of 5,153 pounds, and 33 calves, four of which were abortions and there was one set of twins.

HERD E

Herd E is one of the smaller herds with only average producing individuals. The reactors have all been disposed of and no comparative production figures were available. Nineteen negative cows over a total of 35 milking-years produced 308,361 pounds of milk, or an average of 8,810. Thirty-five calves were born in this period and no abortions occurred.

TABLE VIII—*Summary of herd E*

	COWS	YEARS	TOTAL MILK (LBS.)	AVERAGE MILK (LBS.)	CALVES
Negatives	19	35	308,361	8,810	35

HERD F

In herd F, 17 negative cows in a total of 34 years produced a total of 257,465 pounds of milk, or an average of 7,573 pounds, and 32 calves were born, one of which was aborted. Twenty reacting cows in 37 years produced 218,176 pounds of milk, or an average of 5,897 pounds and 20 calves.

TABLE IX—*Summary of herd F*

	COWS	YEARS	TOTAL MILK (LBS.)	AVERAGE MILK (LBS.)	TOTAL CALVES	% CALVES
Negatives	17	34	257,465	7,573	32	94
Positives	20	37	218,176	5,897	22	59
Difference				1,676 lbs. (22%)		

HERD G

Herd G is another high-producing purebred herd. On the initial test, 8 cows (4 plus per cent) showed infection out of 188 head of all ages tested. The 8 cows were marked for slaughter before testing, because unprofitable. They were removed immediately after test. The next test was four months later, and 3 plus per cent reactors were immediately removed. The next test was in four months, when 2.5 per cent reacted and were removed immediately. The herd was tested again in four months

when one reactor was removed. The next test, in four months, showed no reactors. This test was in May, 1927. There were no more reactors until November, 1928, after some cows were returned from pasture and at this time one reactor was removed. On a test two months later, no more reactors were found, and none since.

This herd was considered comparatively free, yet the repeated finding of new reactors indicated that the disease was slightly active and had not the reactors been removed when they were, there is the probability that the disease would have reached the proportion of an active outbreak. The herd on May 1, 1929, contained 231 animals.

One hundred thirty-six cows in 394 producing years produced 4,469,259 pounds of milk, or an average of 11,343 pounds per year, and 400 calves, of which there were six sets of twins and six abortions from causes other than Bang disease, or 1½ abortions, which, with the twins, left an average of a calf per cow per year.

TABLE X—*Summary of herd G*

	COWS	YEARS	TOTAL MILK (LBS.)	AVERAGE MILK (LBS.)	CALVES
Negatives	136	394	4,469,259	11,343	400

Abortions, 6 (1.5%); twins, 6 sets; calving efficiency, 98.5%.

HERD H

Herd H is a medium-sized herd, producing only an average amount of milk (7000 to 8000 pounds per cow) yearly. It is now free from Bang disease and no comparative milk-production figures were available.

Forty-three cows in 206 cow-years gave birth to 199 calves (96.5 per cent). Thirty-two cows in 1927 and 37 in 1928, or a total of 69 during the two years, gave birth to 72 calves, of which three births (4 plus per cent) were abortions and were due to causes other than Bang disease. This herd qualified for the

TABLE XI—*Herd summary*

	COWS	YEARS	CALVES	%
Negatives	43	206	199	96.5

32 cows in 1927 plus 37 cows in 1928; 69 cows gave birth to 72 calves; 4% aborted; efficiency, 96%.

Bang Disease Free Herd Certificate with 61 animals, April 23, 1928, and requalified 82 animals, July 20, 1929.

The other herds necessary to make the fourteen herds complete were representative of what has been reported above.

Chart I shows the infection curve from a completed summary of tests of the entire institution herd group for the suppression of Bang disease.

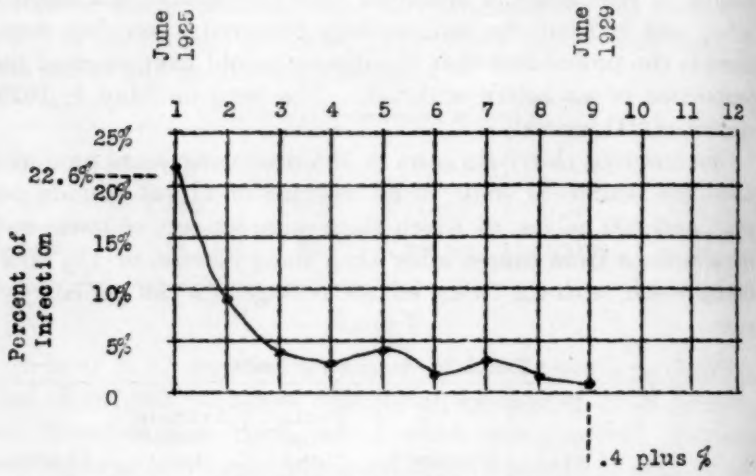

CHART I. Infection curve—complete herd tests. (The vertical lines divide the chart into semi-annual percentages.) It should be observed that the infection was gradually reduced from 22.6% to .4+%

CONCLUDING STATEMENTS

1. During a more or less quiescent state of the disease is a better time to begin testing in a herd than when the disease is active, as indicated by clinical manifestations.

2. Recently infected animals, as a rule, show a lower rate of efficiency from a production standpoint than animals in which the infection is of longer standing.

3. When it is desired to keep reacting animals for a time, to obtain offspring or for milk-production, the reactors should be culled and only the merited and high-milk-producing animals should be retained.

4. The apparently low virulent infection is usually made active and apparently virulent by adding susceptible animals to herds composed of both negative and reacting animals.

5. Added negative animals, in many instances, appear to be more susceptible to infection than the negative animals already in an infected herd.

6. Several hundred calves, born of reacting dams, were raised free of infection to maturity, and many of such cattle, protected from infection, have remained negative to repeated blood tests over several lactation periods.

7. Positive-reacting calves born of positive-reacting dams remain positive but for a limited time. Our observations on but a limited number tend to indicate that once negative they remain negative, unless subsequently exposed to infection.

8. The calves from negative cows in these herds have been uniformly negative and only part of those from positive dams have shown a positive reaction for a time after taking the milk of positive dams.

9. The mature negative group of pregnant females should be closely observed until all animals in the herd have been negative for one year, for the reason that some animals do not react their first time until after having calved or aborted, or for a very short period previously.

10. The more frequently tests are applied and reactors are removed from actively infected herds, the sooner will these herds be established on a Bang-disease-free basis.

11. A single blood test applied to herds in which the disease is in a quiescent state and the immediate removal of reactors will frequently eliminate the disease from the herd.

12. The herds which made the most rapid progress in the elimination of Bang disease were those in which definite principles were adopted in the beginning.

13. The most ideal herd foundation stock are non-reacting calves from non-reacting dams.

14. But non-reacting calves from reacting dams can be safely used if they are separated for a time and are negative to a second test.

15. Different unsuccessful methods for the control of Bang disease were tried in these herds previous to the adoption of the definite method.

16. To those who desire to eliminate Bang disease we know of no better method and can make no better recommendation than the adoption of principles similar to those contained in the Pennsylvania Plan, which has now been successfully operated in Pennsylvania for a period of nine years.

17. The Bang-disease-free herd is 25-100 per cent efficient in the production of calves.

18. It is economical to isolate the infected animals at the inception of any program toward suppression of Bang disease.

19. Bang-disease-free animals produce more milk than do the Bang-infected animals.

20. Segregation of the Bang-infected from the non-infected animals materially reduces abortions in extensively infected herds.

21. Bang infection is not controlled by segregation of infected from non-infected animals.

FINAL STATEMENTS

The writers express their appreciation to the institutions and to all others who have helped in any way in making this report possible.

This report represents the progress which has been made up to the present time in the fourteen herds referred to, and it is our purpose to prepare a more detailed report at a later date.

DISCUSSION

MEMBER: I would like to ask how soon an aborting cow ought to be tested? In general practice we do not get a chance to test them whenever we want to. We have to test them when the farmer is ready. I come from Wisconsin and we think they should not be tested within ten days or two weeks after abortion. Another question is whether you use the rapid method of testing.

DR. FRITZ: We prefer not to take a blood sample from a cow that has aborted, within two weeks after the abortion. We believe that a more accurate test results then. We do not use the rapid method in the Pennsylvania Bureau Laboratory.

MEMBER: May I ask at what time it is advisable to introduce the calf of an aborting cow into the herd, if at all?

DR. FRITZ: We prefer to introduce calves that have been born of positive dams or that come from infected herds after they go off of milk and have passed a negative test. I believe it is a wise precaution, after removing a calf from an infected herd, to leave an interval of sixty days between the first test and retest. The calf should be on a clean premise during the interval awaiting retest.

MEMBER: Are they fed pasteurized milk?

DR. FRITZ: No, sir.

Food and Health Officials Meet

Forty food and health officials, representing the federal government, the states of New York, New Jersey and Connecticut, and eighteen cities located in these states, met in New York City on March 5, 1930, and formed a new organization which will have as its object the bringing together of officials concerned with food and public health work, so that they may discuss problems of mutual interest, exchange notes, and coordinate and correlate their activities. Problems relating to canned goods, poultry and milk were discussed at the first meeting. The group will meet again June 4.

SOME CLINICAL ASPECTS OF NEPHRITIS*

By FLOYD PERRIN, *Lincoln, Nebr.*

I expect that some, in looking over the program and seeing the above title, have been expecting something new on the subject of kidney diseases, but as the writer is a practitioner and not a research worker, new ideas are not to be expected. I believe that the most to be expected of a practitioner is that he be able to assimilate and apply existing knowledge.

My motive for presenting this paper is to stimulate some interest in a condition that receives little attention in current literature or at our association meetings.

In searching through our professional journals for articles on diseases of small animals we find that most of them are on distemper, skin diseases, and morbid conditions of the gastro-intestinal tract, including parasitism. It would seem to a casual observer that these conditions probably cover the chief troubles encountered if the number of articles appearing in print is a criterion and represents the experience of the clinician.

Our textbooks give very thorough descriptions of kidney diseases from the viewpoint of both the clinician and pathologist but there seems to be a prevailing idea that such diseases are rare in animals and exist only in textbooks.

I have come to the conclusion that if we check our work carefully, both by symptoms and postmortem findings, we will recognize kidney diseases more often and have less cases of auto-intoxication, rheumatism, gastritis, and even of intestinal parasitism.

Of course it is commonly understood that most pathological conditions of the kidney are sequelae of some existing or pre-existing condition in some other part of the body, but many times a true history of this is lacking or the causative factor has been eliminated or corrected, so that when a patient is presented to us we are concerned only in the diseased condition that presents itself.

Many of the cases that we encounter where a diagnosis of some form of kidney disease may be made, there is a history that the animal has had distemper, has been wormed "religiously" at more or less regular intervals; maybe has had periodic attacks of

*Presented at the sixty-sixth annual meeting of the American Veterinary Medical Association, Detroit, Mich., August 13-16, 1929.

stomach trouble which might have lasted two or three days, or that there exists, or has existed, some ulceration of teeth or had a suppurating wound that lasted for a long time and from which the patient has apparently recovered. Or it might be even a stubborn case of some skin disease that had been treated with some preparation containing tar or other dangerous products.

You will note that I am using the term "kidney disease" in a broad sense. This is because some of us are not skilled enough to differentiate clinically the various pathological conditions that might be present, and quoting from Müller and Glass, "The practitioner has to be satisfied if he can recognize with certainty that the animal has some affection of the kidneys, and whether it is acute or chronic."

It is a simple matter to diagnose kidney disorders by post-mortem examination but our clients are more interested in ante-mortem findings, so I believe it is going to be necessary for us to improve ourselves in being able to recognize diseases of vital organs by clinical methods. I realize that the symptomatology is somewhat complex but I believe that by a careful study of history, symptoms and tests that one will be able to recognize some of these conditions oftener.

The chief disorders that are encountered I believe are nephritis, acute and chronic. These two forms frequently merge and it is not always possible to draw a line of demarcation. For descriptive purposes, I am going to attempt to describe two forms of the chronic, although my deduction may not always be corroborated by autopsy. The classification used in this paper is taken from Hutyra and Marek.

I will attempt to illustrate the different forms of nephritis by a narrative. The scenes might have taken place at any number of hospitals.

Acute Nephritis

An excited person presents a dog and says, "I have got a pretty sick dog. I think some one has poisoned him," and in the next breath—"Do you think you can cure him? I don't want him to die. Do everything you can for him." After the client has calmed down, the information is elicited that the dog is two years old (some might be older, possibly five or six years); has never been sick before, except when it had distemper; always kept wormed; had acted a little sluggish last night, would not eat all of its supper; this morning acted listless, vomited some, stiff in hind

parts, and staggers some. He says he did not know what was wrong although he had been around dogs all his life, so he brought him direct to the hospital to see if you could do anything for him. A dubious expression comes over your face (wondering about his ability to pay). An examination is made. Temperature, 104.5°F. A few more questions are asked. You finally agree with the client that he has a sick dog. If pressed for a diagnosis, you tell him it is a case of auto-intoxication, gastro-enteritis, or that he has eaten something that did not agree with him.

The dog is left in your care. Maybe a gastro-intestinal lavage is given. If you are inclined not to want to do so much work, possibly a cathartic is given. If the case progresses favorably, which they apparently sometimes do, the patient is discharged in one or two weeks and the owner given a lecture on the mysteries of the proper feed for a carnivorous animal. You also advise plenty of exercise.

If more time is taken before making a diagnosis or administering treatment, evidence of acute nephritis will be noted. Besides the above-mentioned symptoms, an examination of the urine shows the color to vary from nearly normal to brown, sometimes traces of blood. Urinalysis shows albumin. Urinary casts are found microscopically. Sometimes the amount of urine voided is scanty and may be absent for two to five days. Some authorities observe edema of the extremities but the writer has not observed this often, except shortly before death. Most animals are constipated at first; gastric disturbances are common in all forms of nephritis. The elevated temperature noted early in an attack may subside in a day or two. Most cases emaciate rapidly and, if unfavorable, the case is terminated by acute uremia or pulmonary edema. (Hutyra and Marek)

Some of the apparently recovered cases become chronic.

Chronic Non-Indurative Nephritis

Another dog is brought in. The owner may start in by asking if you have got something for worms. He adds further information that he used to worm it regularly every month for a while after he got it, just like the kennel-man told him to, but he got careless and neglected it and finally it got full of worms again and got sick, so he got some of "Dr. X's" worm medicine and gave it to him and "cured" him. In about two or three months he got sick again. He gave him another dose of the same worm medicine and "cured" him. That was three months ago. Now he got sick

a couple of days ago and he gave him some of the worm medicine that used to cure him but it "don't seem to do no good" this time, so he thought that he would bring him to you to see if you had anything that would get rid of them.

In a very tactful manner you probably agree with him that it has worms but that he might have been treating it for the wrong kind and you hand out some of the latest dope on parasites and how essential it is to be able to make a proper fecal examination for the "eggs," an art at which you admit that you are quite expert. A sample of the feces is collected and modern methods are used for preparing the sample, which is then examined with the microscope. After some searching you announce a discovery and in a diplomatic manner the owner is informed that the medicine that he had used was intended for some of the common worms but was no good for "*Ascaris marginata.*"

The owner is persuaded to leave the dog in your care so that you may properly prepare the patient for the ordeal and check the results. If it survives the treatment, the owner is given a folder containing a full description of worms, also with instructions for the owner to be sure and bring the animal back when showing the first signs of worms, which may be anywhere from three weeks to six months. If the outcome is unsatisfactory, it was because you did not get the case in time.

Another case may be presented with about the same clinical picture but may vary in that the owner has a different clue to aid you in making a diagnosis. Something upsets his stomach every once in a while. His appetite may improve after these attacks and he may eat heartily but does not seem to gain. He keeps getting thinner in spite of what they feed and they have tried every kind of feed. The owner is sure it "hain't" worms, because he has been treated for them. You may readily agree with this and treat the patient accordingly. If the patient survives the attack, the owner is given a folder containing a list of the proper feeds for a dog or in lieu thereof verbal instructions are given. If these are followed to the letter, the animal should never have another attack.

The writer has found that in many cases similar to those narrated that we may be dealing with chronic non-indurative nephritis. In the absence of history, it is sometimes impossible to differentiate this form from the acute as in the chronic form it is common for acute exacerbations to occur which might be taken for acute nephritis.

The duration of this form varies from two to three months to two years and usually terminates in the chronic indurative or ends fatally in one of the recurrent acute attacks.

Some of the cases that the writer has observed follow the usual chain of symptoms as described in literature but there is a large percentage of cases that I believe should be included under the classification of chronic non-indurative nephritis. These cases have histories somewhat as narrated above and characterized by acute attacks, lasting one or two weeks, but instead of remaining thin and showing some of the usual symptoms of the chronic form they return to practically normal between attacks. The time between attacks varies, also the number. Most of them terminate fatally the second or third time.

I regret that I am unable to cite anything in the literature to corroborate the above statement. The question might arise if there was not a possibility of this type of cases being affected in the beginning with the acute parenchymatous form and recovering and the recurrent attacks described merely another of the same type or possibly the acute diffuse. This may be possible, also there is some chance for error in making deductions from gross lesions.

Chronic Indurative Nephritis

According to Hutyra and Marek, the chronic indurative form has only rarely been observed clinically. This statement is probably true in the large animals, but I am of the opinion that this form is recognized more often or at least its existence is suspected in affected animals whether it is proven before death or not. The symptoms and course are similar to the non-indurative with some exceptions. The course is more protracted; pulmonary and cardiac disturbances are more often observed. Eye affections are common. It is agreed by most authorities that polyuria is nearly always present and the animals consume large quantities of water. The animal usually remains thin, and chronic eczema is frequently present.

The presence of albumin is hard to detect. Maybe it is entirely absent. It has been my observation that edema is more common in this form of nephritis than in the others.

Purulent Nephritis

The writer has had occasion to observe only a few positive cases of purulent nephritis. There are not many symptoms to differentiate it clinically from other forms except that there is more

evidence of pain on palpation, while in other forms of nephritis there is very little sensitiveness. When this condition is suspected, microscopic examination of urinary sediment may show pus.

A discussion of nephritis would not be complete without a few remarks on the examination of urine. A complete examination should include macroscopical, chemical and microscopical examinations.

An examination by the practitioner probably will never be as thorough as it should be, due to the difficulty in being properly compensated for the time expended, but there are times when enough should be done to corroborate our suspicions of the existence of some morbid condition. No one part of the examination should be depended upon for a positive diagnosis in all cases.

The most frequent chemical test used is probably to detect the presence of albuminuria. It has been the experience of the writer that one should not always be satisfied with the results of the test of a single sample. If it should be negative, and there are symptoms of nephritis, it frequently happens that one sample will be free of albumin but maybe urine collected later will show it. This is especially true in the chronic forms. The presence of albumin should not be a basis alone for a diagnosis of nephritis but one may be reasonably sure if enough other symptoms are noticeable also. A microscopic examination should be made, especially when albumin is detected. The presence of blood corpuscles and urinary casts is of importance in making a diagnosis. Some authorities claim that a microscopic examination is of greater importance than a chemical analysis.

It is not the intent of the writer to attempt to lessen the importance of gastro-intestinal disturbances, including intestinal parasitism, but to stress the point that there is some danger of nephritis being mistaken for these conditions, as gastric symptoms such as vomiting, irregular appetite, etc., are some of the most constant symptoms of nephritis. Furthermore, nephritis, when a complication of some contagious disease, should not be taken too seriously.

This paper is not an attempt at a treatise on kidney diseases but merely some of the observations of the writer. Complete descriptions of these conditions are available in textbooks and it is my belief that there is an opportunity to apply this information more often in small-animal practice.

Some exceptions will probably be taken to statements made in this paper, but sometimes knowledge may be gained by criticism.

THE VETERINARIAN—AN ECONOMIC FACTOR IN THE POULTRY PRODUCTION BUSINESS*

By A. D. GOLDHAFT, *Vineland, N. J.*

A great deal has been said in behalf of farm relief and farm legislation. Farm legislation of one kind or another has been fostered by various groups of men and interests. No doubt there is merit and need for such governmental aid. My remarks, however, will be limited to that field which cannot expect or profit very much by these means. I speak of the thousands of farmers who will not enter into the financing for moving crops or ask for relief for their surplus products. There are agricultural problems that must be settled by the farmers themselves. Good management, efficiency and economic production have been the aims of industry for many years. The farmer has not given this phase of the problem sufficient serious consideration. The proper kind of management gives profitable results.

The poultry production business is no different from any other business. To produce or manufacture any commodity for a profit it must be produced or manufactured economically. In order to make a profit our large industries are headed by efficiency experts.

For many years, at veterinary conferences, many new plans were presented in handling disease problems. The prevailing comments at these conferences have been that these new ideas would not be applicable to every location. However, it was found that in most cases many of these new ideas and treatments could be properly inaugurated with the small farmer.

To explain how the veterinarian functions as an economic factor and that his services can be of value to all kinds of farmers, it may be well to describe the type of agriculture in south Jersey. There is the general farmer, engaged in dairying, truck farming, potato farming, small and large fruits and poultry. Truck farming and poultry raising are by far the most important agricultural industries of this part of the State. The areas devoted to truck farming in most of this section are fertilized heavily and farmed intensively. These farms are small and are known as the one-horse and one-cow farms. Some of these farms have two or three horses and in a very few instances have up to six horses. There

*Presented at the sixty-sixth annual meeting of the American Veterinary Medical Association, Detroit, Mich., August 13-16, 1929.

are no gentlemen farmers in this section and the farms are not for pleasure or recreation. The farmers are real "dirt" farmers, who have specialized in one crop or another for years, but their financial progress has been retarded. The county agent, vocational teacher, feed service bureaus and private endowments used in certain cases have not helped the situation to any noticeable extent.

From 1914 to 1919, there were calls occasionally to help a poultry farmer with some of his disease problems. Not until 1919 was this branch of veterinary medicine given any serious consideration. During that year there was an outbreak of tapeworm infestation in poultry on seven different poultry ranches. The pullets on five of these ranches showed this tapeworm infestation during the summer. These pullets made a very poor growth and, in addition, there was a very high mortality. During the fall and winter these pullets continued to die and at no time during the laying season was the egg-production over 20 per cent. The two other flocks showed the tapeworm infestation during the height of the laying season. There was also a high mortality n these pullets with a very low egg-production. The next two years brought many new poultry diseases of which little was known.

Poultry Diseases of Paramount Importance

A careful survey of this new field of activity, diseases of poultry, where poultry is an industry, impressed itself as one of paramount importance to the veterinarian. If the great loss in the poultry production business could be lessened by a reduction in mortality of baby chicks, pullets and hens, it would increase the profits of the poultryman and increase the income of the veterinarian.

The high mortality in the poultry production business was the discouraging factor and the one great setback that prevented success. This high mortality was not only among baby chicks and in growing pullets but was found also in the layers and in the fattening batteries. An unusually high mortality was found in hens also. Baby chicks that were brought from long distances suffered the highest mortality in most instances. In many cases a 50 per cent mortality in the first fourteen days in the life of the baby chick was very common. The mortality of the laying pullet in her first year was entirely too high, sometimes running up to 35 or 40 per cent, especially when the flock was visited by an acute infectious disease. The average mortality in the laying

pullet was from 15 to 25 per cent. This mortality is considered satisfactory by the commercial poultryman whose chief commodity is eggs.

Reference to the laying pullet in her first year means from the time that she has been put into the laying-house up to the expiration of one year from that time. The pullet, as a rule, is put into the laying-house in September or October. Of course this depends entirely upon the time that the pullet has been hatched. A better and a safer rule which has been adopted by the more progressive breeders is to have the pullet come into laying between five and one-half and six months of age.

The average profit in the poultry production business from eggs alone ranges anywhere from $1.80 to $3.00 per bird per year. The breeders have other sources of revenue, such as hatching eggs, baby chicks, mature pullets and breeding cockerels. What are the factors which are responsible for such a difference in profit? They are many, but the outstanding factors are good management, efficiency and low mortality. How best can profitable measures be introduced into the non-profitable or low-profitable poultry-ranch?

Both Poultryman and Veterinarian Concerned

It was not only the concern of the poultryman. Veterinary practice had to be altered to meet the requirements of these men, and the part that the veterinarian must play as a factor—an economic factor—was very real. The treatment of sick birds during egg-production was very unprofitable. In cases where remedial measures were apparently helpful the ledger showed a loss at the end of twelve months. This was particularly true when there was present an acute or chronic infectious disease or a heavy parasitic infestation. Follow-up visits, as in the case of other animals, were not practical and very unprofitable to the poultryman.

The veterinarian should function primarily in the capacity of an efficiency expert to the poultryman. It should be his duty to practice preventive medicine and stop a recurrence of conditions that have been prevalent for years and which have been unprofitable to the poultryman. The service of the veterinarian should not only be limited to the poultry-ranches but should extend also to the dairyman, general farmer, trucker, and small and large fruit farmers.

In south Jersey all these branches of agriculture offered a more fertile field for veterinary service than the commercial poultry-ranches. The reasons for this are, first, that large acreage as a rule would allow certain soil practices which would be very helpful and which were not possible on a five-acre poultry-ranch; second, the downward trend of this group economically made an easier approach to offer this service; third, the continual dissatisfaction of the wives and children with general farm conditions also gave us an easy entrance to introduce this service; fourth, the general farmers were acquainted with veterinary service for larger animals while the commercial poultryman did not consider the veterinarian an asset to his business at all.

New Plan Adopted

With this general farming group the following plan was adopted. The wives or the sons were advised to begin with a small flock of 125 pullets, eight weeks of age or about 350 day-old baby chicks. They were advised to construct a poultry-house (20 x 20) known as the N. J. Multiple Unit house. Wherever possible, this work was done in conjunction with the county agents, vocational teachers, and field men of a privately endowed fund who devote their time to settling city people on farms. To make this a real practical business venture, especially where it applied to the farm boy, and to make this farm boy feel independent, it was suggested, first, that the boy have full control of this project and, second, that the father endorse a note for the boy which would be taken care of by the bank or a private endowment fund used for this purpose. To those boys who showed a keen interest and a special adaptability in poultry, scholarships were arranged for short courses in poultry. The veterinarian's policy in all cases was to act in an advisory capacity and to take care of all problems pertaining to disease prevention.

For the past nine years, 165 general farmers have entered the field of the poultry production business, either directly or indirectly. With some of these the revenue from poultry represents the major source of income. In many instances the income from poultry is the only income they now have. The comparison of this group of utility poultrymen with the general farming group in south Jersey is most favorable. Many of these utility poultrymen have grown from 125 pullets to as high as 2500 layers. While I do not mean to advocate that all general farmers should go into the poultry business for relief, I know that general farmers can

help themselves and have money every week by sending to the nearby markets broilers, roasters, capons, eggs, ducks, geese, etc. Compared with the general farmer, who is always gambling with one or two crops a year, and in many cases whose fertilizer notes have not been reduced within two or three years, this plan deserves a trial.

Many of the general farmers in this section have been helped to such an extent that they give credit for their success in general farming because of the revenue derived from poultry. The demand for fresh eggs and fresh poultry products changes the complexion of general farming in this section. The ever-growing demand for poultry products because of the high food and nutritive value must continue.

The average poultry-ranch located in south Jersey contains about five acres. The cost of such a ranch, including 1000 birds and all equipment, is about $7500. A charge of one-half to one per cent annually can be made against the total cost of ranch with mutual benefit. For this compensation monthly visits are made, autopsies performed and the necessary medication supplied. Other arrangements can be made where the calls are long distance. In the case of the general farmer and poultryman combined they should be advised to bring birds to the veterinarian's office for monthly autopsies. The general farmer has taken advantage of this form of insurance more than the commercial poultryman. Another form of insurance for a healthy flock, normal egg-production and normal meat-production, is the agglutination test for pullorum disease, vaccinating chickens against fowl-pox, and rearing of pullets either in permanent or partial confinement, where there has been present a heavy parasitic infestation or other infectious diseases.

Quack Remedies Make Their Appearance

With the great growth of the poultry industry there has also arisen a proportionate increase and sale of quack remedies for poultry. The use of these remedies increases the cost of production and consequently means that much loss to the poultry farmer. It is the duty of every veterinarian to educate the poultryman and the user of poultry remedies of the necessity of steering clear of the so-called "cure-alls." This is an easier task than it may seem. Several years ago a carload of worm medicine for poultry arrived from the Pacific Coast weekly in a certain eastern poultry center. The praises of this remedy were sung

high by the salesman, and a few testimonials were distributed by the poultrymen in that section. We find that the poorer the commodity that is to be sold, the better or more high-powered salesmen are necessary. A good commodity sells itself. It does not need salesmen or advance publicity. As a rule a veterinarian is a good commodity. In this case of the worm medicine, the poultrymen who had given these testimonials were approached and it was suggested that, in justice to their future investment and also in justice to the rest of the poultrymen in that section, it would be only proper and fair to run a pen of birds under control which would not receive this special worm treatment. This was easily accomplished and the results were that instead of a carload of this worm medicine weekly it became monthly and now it seems that not even five gallons of this remedy is sold monthly. This is a service that every veterinarian can render to his community.

Poultry Clinics

Another method of approach by quack-remedy manufacturers. They employ a good publicity agent, an old time poultryman and sometimes a young graduate veterinarian. Notices are broadcast over the countryside that Dr. So and So will be at a certain place at a stated time to conduct a free poultry clinic. They advise bringing your poultry disease problems to this clinic. Postmortems will be held without any charge. How best can this move be checkmated? It works a hardship, first, on the poultryman; second, on the community in which he lives; and thirdly, on the veterinarian, at least, temporarily.

These clinics were always attended and the technic of the operator was observed. Particular attention was paid to see if any blood was withdrawn from vital organs for culture purposes. A few questions were asked without antagonizing the speaker or audience. In many cases the speaker would recognize the justice of these questions and would admit that it was not only medicine that they were selling but that they were also interested in good service to the poultryman. Control pens were suggested and that these be kept without treatment to compare results. It was suggested that, if those who were in control of these poultry clinics were really interested in a good service for the poultryman, in the event that the results are not what they were guaranteed (poultrymen to be the sole judges) no charges should be made for this medicine. In this way the speaker was not offended and the

audience as a rule appreciated the veterinarian's interest in their behalf. So far these poultry clinics have not made much progress in this community. This is a service that every veterinarian can render.

There is no guess work in preventing poultry diseases. With the help of biological tests and postmortem examinations, we rarely, if ever, make a mistake in the diagnosis of the disease or condition in poultry. This is a great step forward in preventive medicine, and while the treatment of poultry diseases is new to the veterinarian, great progress has been made which is already beginning to bear fruit. It is a great satisfaction to feel that the veterinarian is playing his part admirably in the recognition and elimination of poultry diseases. The veterinarian is the outstanding economic factor in the poultry production business. Is he capable of impressing on the farmer this crucial position? Much depends on being sold on the idea himself. It calls for knowledge of this problem, economic and technical, then the willingness to render the important service he has to offer and which the farmer requires.

Industry finds it advisable to employ professional men for their legal, engineering and auditing problems that exist or may arise at some future time. For this service a fee is paid, usually proportionate to the size of the business. Then again there are the established institutions of insurance of all kinds for which a premium is paid. These investments are considered worth while. Isn't it logical that the farmer has reached the point where he should be made to see the value of a professional advisor for his disease problems. The veterinarian who is the guardian of the live stock industry of this country must eventually sell or give this kind of insurance to the poultrymen. In all that has been said it must be carefully noted that the arguments presented applied to poultry production whether practiced exclusively or in conjunction with any other branch of farming. In these days of scientific practices applied to all business, the farmer must avail himself of all knowledge and equipment to promote his interests. The veterinarian is the most scientific avenue to give this service, and let not the profession underestimate the good that can be done to all concerned.

DISCUSSION

DR. JOE H. BUX: You say you have been offsetting these food clinics by holding some yourself?

DR. GOLDHAFT: No, I always attend these clinics to protect the poultrymen

in my community from being humbugged by quack manufacturers, and I do not let them put anything over if I possibly can help it.

DR. B. T. SIMMS: Do you have a county agent in your county?

DR. GOLDHAFT: Yes, sir, we have a very good one.

DR. SIMMS: We have been able to stop those things going through the country. We get the county agent in and tell him that if these people hold a diseased bird clinic the farmers will be exposed to all of the other diseases in the State, and may take the disease home with them. The county agent, we have found, can stop them. We have been very successful in stopping those fellows, by giving the county agent a little talk on the danger of the accumulation of diseased birds, getting all the birds into one building, exposing them to other infection and possibly taking those diseases back to the other birds.

DR. GOLDHAFT: In my location, of course, I am a little differently situated than some of you. But you cannot stop anybody from conducting his business the way that suits him. He can advertise in the newspapers that he is going to hold a poultry clinic and no matter who you are you can't stop him.

DR. SIMMS: Well, they won't hold it if nobody comes. If the county agent stops everybody from coming they don't hold one.

DR. F. C. TUCKER: My poultry practice is chiefly in the winter time and largely confined to B. W. D. testing. I have tested for five years. I find that that is one of the best services that a veterinarian is able to render his clients. I started testing the first year, for just one hatching for a young fellow in my community who started up a small hatchery. The next year I just tested for him but I tested twice the number of birds that I did the first year. This next year I will test fourteen hatcheries. I think the veterinarian is overlooking a very good opportunity to render a wonderful service to his community if he does not interest himself in poultry practice. There is nothing that I know of in our community that I could do that would be of greater service and I know that it is very much appreciated there by the poultrymen.

I am in a fairly good poultry community, Kosciusko County, Indiana. We have three towns there that are close together. One town, Mentone, ships two carloads of eggs each Saturday; the next town east of it, Burkett, ships one, and my town, Claypool, also ships one each Saturday. Those eggs are shipped by freight. They get in on the New York market on Tuesday, I guess, sometimes possibly on Monday.

The farmers bring their eggs in and ship them to any commission men they want to. These eggs are consigned to draymen in New York and the draymen distribute them to the commission men. In that way the farmer can ship to the commission man that he wants and the check is sent back to the farmer, who does his business direct with the commission man. That is a very good asset to the poultry business.

CHAIRMAN STAFSETH: I would like to hear from any practitioners who have had experience in this line. I think that this problem has come to a point where it needs a solution. I know the intelligent and up-to-date poultrymen in Michigan are continually asking when we expect to put intelligent and up-to-date veterinary service at their disposal, and we have to do something about it.

DR. N. W. ACKERMAN: Along this line of veterinary service, I have talked with a good many veterinarians and I believe that one of the first things we will have to solve, before the veterinarian can become a real asset to the poultry business, is for the veterinarian himself to know when the birds are being given proper care. In other words, he must put himself in the position where he knows the poultry business himself. I believe there are many veterinarians falling down in giving service because they don't know the proper conditions under which birds should be kept and therefore are unable to recognize faulty management when they find it.

I really think that one thing has more bearing on the proposition than any other. I don't know how it is in other parts of the country but up in my territory I believe that fully 75 per cent of the cases that come under my observation are matters of faulty management and if the fault is corrected you can solve most of your problems without the aid of anything else.

DR. L. W. GOSS: I have found in many instances that veterinarians do not understand management, feeding and so forth; they do not know what a

good diet is. It has occurred to me recently that if it is possible we should encourage veterinarians to subscribe to and read poultry journals. I think that would educate them; they would know the problems that the poultryman is up against and if they read very much in them they could soon learn something on management. I think it is our duty to endeavor to encourage veterinarians to subscribe to and read a poultry journal.

MEMBER: I would like to ask Doctor Tucker whether he uses the long method or the short method of testing, where he gets his antigen and how often he tests the birds.

DOCTOR TUCKER: I use the long method. I get my antigen from Purdue University.

MEMBER: What do you charge, Doctor?

DR. TUCKER: I get ten cents for testing. I charge a cent for the bands too. I put on the bands. I carry two men with me. I carry a man who puts the bands on and then another man to hold the bird while I bleed it. I sometimes bleed one thousand birds a day; I intend to bleed that many. I get my bands from the National Poultry and Band Company, of Newport, Kentucky. I buy the steel adjustable bands, with three holes in them. You can use the same size band for your larger birds or the smaller birds. I find those are good bands. They are easily applied and stay on very well, year after year.

MEMBER: Do they have a lead rivet?

DR. TUCKER: Yes, they have a lead rivet that you mash down. They have a special instrument to seal these with and your man will get proficient in a little while and he will put those on as fast as you can bleed them.

When I first started to bleed I was very slow; in fact, I didn't know anything about the poultry business. This young fellow that I have told you about, the first man I tested for, came in one day and asked me if I was interested in testing chickens for B. W. D. and I told him I didn't know very much about that. He wanted to know if I didn't think it had some merit and I told him I hadn't given it very much consideration. I didn't know. He told me that he had been studying the matter somewhat and he thought there was considerable opportunity to control the death of little chicks and that he could improve the quality of chicks that he put out.

Finally, he insisted so much that I do the testing that I became more interested in it. I first told him I would select the blood samples and send them away to a laboratory. I didn't think there would be very much to the business. But he insisted so much that I do it myself that I immediately got in contact with Dr. Craig, at Purdue, and tried to freshen up and learn something about this business. I thought that if he was interested in it so much I could be interested in it myself.

So that is the way I got started testing and, it might be of interest to you to know, and possibly it is a pretty large statement to make, but that man, for the last two years, has guaranteed his chicks over this fourteen-day period. You buy a hatching of chicks from him and he will write you out a contract that you are to report back to him in fourteen days and if you are fairly well situated to brood chicks and your loss exceeds five per cent, he will pay you back the money over the five per cent.

The first year, a year ago last season, he paid out about $80 in death losses. He has 95,000 chicks and he considered that very, very cheap advertising. This year his losses were not so much.

He sells all of his chicks locally; I don't think that he has shipped an order of chicks either last year or this year and the people with whom he does business are all in that community; they all drive there for their chicks.

DR. SIMMS: Won't he fill an order for a distant shipment?

DR. TUCKER: Oh, yes, he possibly does, but the local demand takes up all of his chicks. And I will add, too, that that man has increased his incubator capacity every year since he has been blood-testing.

In my community there, all the chicken problems were taken to this hatchery man. When you can show a hatchery man that you know chick diseases, poultry diseases and something about nutrition—and, by the way, that is a very big problem, nutrition—and these other things, he is very glad to refer all of the complaints that come to him to the veterinarian and I think that one

of the first duties of a veterinarian is to acquaint himself with the chicken and with the disease problems.

MEMBER: How often do you test those birds?

DR. TUCKER: Once a year. In badly infected flocks I retest those, but most of the testing is once a year. I start testing around the middle of October or the first of November. I will start this year possibly around the middle of October.

The broiler business has increased each year, and they are starting their incubators earlier; some are starting them around the middle of January and some even the first of January; some of them later on. Some of the hatchery men hatch only White Leghorns. These predominate in our community.

DR. GOLDHAFT: Did you ever use the intradermal test?

DR. TUCKER: I have used that on some reactors. I used it once and I thought it was all right. I went down to our state meeting and I was telling Dr. Craig and another gentleman who sits in this room how highly pleased I was with it after I went out and read the reactors.

I got home and told my folks. You know, there is a lot of work to this blood-testing. Using a pullorin test is a lot of bother, and unless your folks will work a little they are up against it. So I told them, after I read these reactors, that I thought next year I was going to use the intradermal test.

So I went down to a state meeting and I told Dr. Craig what I thought of the pullorin test. They gave me the laugh and told me I had better stay where I was, that I was possibly getting into a lot of trouble. So I took their word for it and I am well satisfied the way I have been getting along; and the hatcheries are well satisfied too.

MEMBER: In this work that you have been doing, how do you find that your infection is bacillary white diarrhea? Now, if I am not mistaken, you said that you will get a reaction from typhoid in your agglutination tests, as well as you will from white diarrhea. Have you ever checked up on that? It has been my experience that I will have just as much typhoid as I will bacillary white diarrhea.

DR. TUCKER: Yes, sir, one of the things that I asked some of the flock-owners, when I would go into a flock, is, "How did you raise the little chicks last year?" Well, if they tell you that they had a pretty high death loss in their baby chicks, you can rest assured that you will probably get a lot of reactors in there and you can go and post these birds after they react. You find out whether it is B. W. D. or fowl typhoid. This year I found one flock that had been tested. There were 50 per cent reactors. When I retested I got about 18 per cent reactors in about 1800 birds.

MEMBER: Is it necessary to get rid of the fowl typhoid cases?

DR. TUCKER: Yes, it is.

MEMBER: So it doesn't matter if you do pick a typhoid reactor?

DR. TUCKER: I never fail to pick out one that is even suspicious, because I feel it is not a loss to the flock-owner. He can put these birds on the market and get their value out of them.

And another thing I tell them, that their hens are not good layers. Once in a while you get a cocky flock-owner and you tell him that. When he gets his reactors picked out he thinks they lay just as well as the others. He will hold them a while to see whether they are good layers or not. Invariably he will be glad to come back to you with the story that what you told him was right, that they were not good layers.

I recall one flock I tested this year that had been culled about a week before by the county agent. I didn't know this owner. I went into the hen-house. By the way, you will find that the ladies are very much interested in these birds and they want to know what there is to know about them. They are right out, when you are bleeding, a lot of times, and they want to know all there is about the disease control. I remarked to the lady that she had a very nice flock of birds and they were good and healthy and she said, yes, she had just had them culled and I said, "Well, it looks like the county agent did a good job of culling." This was a very small flock; there were only 86 birds in this flock.

I never see the flock after I test them. I never see the flock but once, just when I draw the blood. I give the report to the hatchery man and let him go back and take the reactors out. When I gave the report to the hatchery

man, I said, "I am glad that you are giving this report to the lady instead of of me. She will surely feel bad about picking 30 reactors out of that flock of 86 birds." So he went to her and told her, "Now, Dr. Tucker has pulled a great many reactors out of this flock, and if you don't care to take those out I will discard this flock and we will get another flock."

Well, the lady said she was interested in producing a high quality of chicks and she didn't want to keep any diseased birds and she wanted them out; she wouldn't mind keeping these reactors a few days to see whether they laid or not. The day before they took the reactors out, the flock laid 25 eggs. They took the reactors out and the next day the flock laid 26 eggs. That is what I had told her, that you will find that the reactors are very, very poor layers.

MEMBER: Was this flock pullets or hens?

DR. TUCKER: This was a pullet flock.

DR. W. P. BOSSENBERGER: I started to dabble with poultry about four or five years ago and I find that it is not all in feeding and keeping them free from parasites. I find that many of the diseases are due to poor ventilation. We have a lot of diphtheria and roup in Iowa. Four or five years ago they would come out to vaccinate the flocks. But they soon fell down on that.

I went back and looked over the housing conditions and so forth and found that many of the birds were kept in poorly ventilated buildings.

I got to studying the ventilation and in some places I even gave them a diagram to help them to locate their intakes, outlets, and so forth. Well, that helped considerably.

Here about three years ago I went up to a man who called me up and said he had the roup. He had a new hen-house. I looked his flock over. He said, "Go over there and look them over." The man drove me into the yard and I looked the flock over and he came over shortly and said, "Well, what do you think about my new hen-house?" I said, "Roy, you have got a fine hen-house but your ventilation is absolutely incorrect; I might as well tell you the truth as to tell you you have got a nice hen-house, when I know it is not right." "Well," he said, "what is wrong now?" "Well," I said, "you have got a row of windows up at the top. Your cool air comes in here and the warm air goes to the top." "Now," I said, "if you put in tubes in those ventilators, put in your intakes, close your windows up, close your doors up, I think you will find it will be different." And I said, "I am not going to vaccinate this flock until you change your ventilation. If it doesn't produce results, then we will vaccinate later." That has been three years ago and I have not vaccinated for the man to this day.

DR. EDWARD BOESEWETTER: I was very much interested in the talk that the last gentleman gave. We have about the same condition and I have come to the conclusion that all chicks, especially baby chicks, or brooder-house chicks, as we call them, do not die from disease.

I have had occasion to get into these brooder-houses daily in the season and the conditions in there are sometimes appalling. They buy a cheap brooder that they do not know how to operate and, first of all, there is no ventilation and they are used to raising only, possibly, about 100 chicks.

Now, last year, they put in as high as five or six or seven hundred chicks under a brooder that ought to accommodate only 300 at the most, although they are advertised to hold 1,000 chicks.

Those are the conditions. I get into these houses in the morning and see chicks piled up, flattened our like pancakes—and, dealing with the farmer, you have got to give him some advice and got to make it comprehensive so that he can get your point. I put it to him in this way: I say, "For instance, you went to town, to some football game or something, and you were jostled around every hour of the day, and, at feeding time here it is a football game all the time. I just want to make this remark, that the weaklings are absolutely worn out; they are not killed by disease but they are worn out and, as a general practitioner, of late years, I have taken to postmortems, and I hold postmortems on all the chickens I possibly can, free of charge. They bring them into my office and complain about certain chicken ills. And I say, "Bring in at least three chickens for comparison," and, of course, we look them over and if we can't go ahead we go a little further.

But it is interesting work, it takes only a few minutes and you can prescribe and advise intelligently.

Chicken practice started in very slow with us. Chicken-raising is a sort of a side issue up there, although we have quite a few good-sized hatcheries right now and one, in particular, in which I am very much interested, has taught me a whole lot as to the feeding problems. Not only feeding problems but as to the value and the economics of the feed.

These last two years, with all the commercial feeds offered for sale to these people, I have taken up a sort of an educational campaign, teaching these fellows to buy their feed separately, their buttermilk and their grains separate for the simple reason that they can judge the quality better and make their own mixtures more economically, because these compound mixtures that are offered for sale, I will venture to say 99 per cent of them, are sold with too much velvet for somebody.

We have a law in the state of Wisconsin making it compulsory to have the contents of the feed specified on the bag, but there is no mention made on these bags as to the source of their materials.

I am going to switch off just a second here on the dairy practice. Not long ago I was asked to make a blood test for a herd in which there had been quite a few abortions, and after drawing the blood the farmer said to me, "Doc, what do you think of this feed?" He had a half-barrel of stock feed standing there. I said, "What do you pay for it?" "Oh," he said, "ten dollars." I said, "How long does it take to feed this half-barrel?" "Well," he said, "with the bunch I have got, forty or forty-five head of cattle, I feed that every month." "Well," I said, "have you noticed any benefits?" "Well, no," he said, "but I think it is all right." "Well, "I said, "how can you show? How do you know it is all right? Have your cattle increased in milk-production or have they increased in health or weight or otherwise?" Well, he had nothing to say about that. I had hardly gotten through with him when he took me to some dairy feed which he told me he paid $59 a ton for. Well, he got a handful and showed it to me and it appeared to be mostly alfalfa meal and so on and on the bag it stated that it was 14 per cent protein ration, something like that anyway. Well, he had been feeding that. He said, "That is good stuff, very good stuff." "Well," I said, "listen, the figures are running too high. Give me a paper and pencil and I will give you a little example. In business, if a business man invests $10 he ought to get $10.50 back. You fellows buy these feeds, paying a high price for them and you have nothing to show for it. How long does it take you to feed some of this feed?" Well, he told me that he fed a ton every twelve days, and I think he did, because he was pushing it to them. I said, "Now listen, how much of your home feed have you saved? What has your milk increase been? What do you figure the value of the increase of your animals, the beef value in any way at all?" And when I figured this all out for him I found out that that man was feeding this feed at a loss of about, at least, $15 to $18 in the twelve days. I told him, "Why, listen, you can't afford to feed that stuff." I am just relating this as an example.

Now, with a chicken-feeding problem the same conditions exist and this hatchery man with whom I have been working quite a while, told me that his saving is considerable by buying the feed. He is able to judge the quality. He makes his own mixtures. It entails a little work but he says he has the facilities to do so and he has been saving lots of money.

And on this incubator proposition, although I don't know much about it, I have learned a whole lot from this man as to how to handle it and he has told me whether I was rightly informed or not, that he has pullets that are ready to lay in a little better than four months, they are laying eggs and doing well.

I have done some testing for him; not the pullorin test but the intradermal test, and we post every chicken that goes wrong. He has even gone so far that when he sells a batch of baby chicks, which he does, he sells lots of them, he advises the party as to how to take care of them properly and, if possible, he goes out to see that they are all right.

I will just repeat this thought, that I think the ventilation, the housing conditions, sanitation in general, and so on, play a very, very important part in this chicken game.

Dr. G. S. Weaver: I was like our former speaker in connection with home-made feeds and commercially-mixed feeds at one time, but my views have changed very radically on that subject.

I am not interested in whether feeding concerns sell their feed or not but I am interested in the poultry industry, raising normal chicks with a normal mortality and maintaining those birds in normal health.

Now, in connection with our laboratory work, we do considerable nutritional work, and we probably can produce as good feed as the better feed-houses, but when it comes to producing a feed of the same quality, that will maintain the same degree of health as the best commercially-mixed mashes, it will cost us just as much as it does to buy it.

Now the ingredients are the necessary ingredients which give the essential variety to the feed and they will cost the individual so much more than it does the man who buys in large quantities that in reality, I think, there is nothing to be gained, particularly with baby chicks. The food consumption, per day, is so small that you can pay anything within reason to get the feed which will raise those chickens successfully.

Dr. Goldhaft: Mr. Chairman, when Dr. Beaudette and Dr. Black first outlined the plan of permanent confinement, where there was a heavy parasitic infestation, the poultry farmers in my section laughed at the idea and would not take it up.

But I want to tell you that those fellows have suffered heavy penalties, particularly our good breeders, breeders who get as high as $100 a bird. They are now, not only carrying their birds under permanent confinement but they are even breeding in that way, which they never did before, and getting excellent results.

I simply make this illustration for this reason: The question of testing for pullorum disease is so important that I predict that in the future there will be no baby chicks sold anywhere to those who are interested in the poultry production business unless those baby chicks are free from pullorum disease. You cannot stay in the business and be successful unless you buy baby chicks that are free from pullorum disease.

Furthermore, I know for a fact, that certain medical investigators in Philadelphia are going to begin a piece of work next year to find out whether there is any connection between the consumption of eggs, produced from birds that are infected with pullorum disease, and infection in the human system. I don't know whether there is any connection but I know this piece of work is going to be started. That is another reason, if there is anything in that at all, that those who eat and consume eggs for their nutritive value will want to eat eggs that are from birds free from any infectious diseases.

The practice of the veterinarian in testing the birds comes in the months of October, November and December, when, as a rule, their general practice is very light. They have very little to do the rest of the time.

I know that last year I tested 40,000 birds. I charge 4 cents, not 10 cents, and while the income is not very much and there is a lot of work attached to the test, it is enough at that time of the year to compensate me, rather than sitting around, and it is a worthwhile thing and it is the best service that I can give to my section, or the veterinarians can give to their clients anywhere in the country.

Mr. G. A. Schroeder: Recently we had an opportunity to conduct a test on bacillary white diarrhea in cooperation with the Michigan State College. One flock originated from birds that were free from reactors; another group was from reactor stock. The mortality in the reactor birds was 16 per cent and no mortality from the birds where the parent stock was found to be free.

The increased income, because of the fact that the birds were apparently not reactors, was $312. That doesn't take into consideration, probably, the chicks that came from the reactor stock. Those chicks that came from the reactor stock did not grow as well and probably had a much higher mortality later on. We conducted the test for only three or four weeks.

But, just the same, an increased income of $312, just because of the bacillary white diarrhea test, I think, is really substantial evidence as to the value of the test and I think it is a pretty fine argument that you men can use in your work.

DR. BOSSENBERGER: In regards to using commercial feeds in starting out with baby chicks, I have no grudge against commercial feeds but I find my chicks do better with more simple feeds than they do with commercial feeds.

But in starting out these chicks on commercial feeds, I find that they get a sort of albuminous mass in the crop. I could not eliminate that until I got to just the simple old oatmeal, plenty of buttermilk and plenty of grit, and, after they are a week old, you put them on the fine feed.

I believe a large percentage of the trouble in baby chicks, the first week or ten days, is these fine feeds. Now, I find that some have soy-bean meal for filler. They use soy-bean meal to make varnishes and paints and so forth and I have often wondered whether that is not the cause of this albuminous mass in the crop. Since I have used just the plain oatmeal I have not had that trouble.

CHAIRMAN STAFSETH: I would like to have you get hold of a publication by the University of California, called the "Effect of Early Handicaps on Chicks," in "Hilgardia," for March, 1929. I will bet that some of you have to change your opinion as to whether or not baby chicks die from disease or what they call mismanagement.

Now, I don't want, for a minute, to minimize the idea of sanitation or mismanagement, but too many people hide behind one thing in order to get out of disease control work. I would like to have you read that article.

And another thing I would like to have you do is this: Don't flirt too much with this feed problem, because there are some commercial feeds just as good as anything you can make and some that are bad, but if you begin to act as an arbitrator on feeds you are getting into hot water. Let them do that themselves. Be disease experts, but don't argue feeds.

Regulations for Interstate Shipments of Live Stock

Owners of live stock often have occasion to consult veterinarians when they want to ship domestic animals from one state to another. When such shipments are to be made, it should be known what regulations must be observed. These regulations vary somewhat for animals intended for breeding, feeding, exhibition and other purposes. To aid interested parties in obtaining information governing each of these cases, the Bureau of Animal Industry, U. S. Department of Agriculture, has published a circular which gives brief statements concerning the essential requirements for animals entering each state. This is Miscellaneous Circular 14-MC, "State Sanitary Requirements Governing Admission of Livestock," which has just been revised and is available on application.

The information in the circular is obtained by the Bureau from the officials of each state, and deals principally with the movement of cattle, horses, mules, asses, hogs, sheep and goats. Some states also have regulations governing the admission of other stock, such as poultry, foxes, dogs and cats. Information as to who may inspect animals for shipment, what tests are acceptable, and the state officials who have charge of inspection also are given.

THE USE OF SALTS IN THE PRODUCTION OF BLACKLEG FILTRATE AND BACTERIN*

By JOSEPH P. SCOTT, *Manhattan, Kansas*

Various salts, especially ferric salts, and ammonium and potassium salts, have been found to increase the growth of different microorganisms.

In 1925, Welo and Baudisch[1] found that certain iron salts increased the virulence of *Pasteurella lepisepticum*. Later they found that the atomic configuration of iron and other salts was related to the activity of certain mineral waters.[2] Warburg[3] showed that iron was the important constituent of respiration ferment.

These experiments suggested that it might be possible to increase the virulence of blackleg cultures by the use of iron salts. Scott[4] found that ferric salts increased the virulence of all the blackleg strains tested. An avirulent strain, which was nonpathogenic for guinea pigs in doses of 2 cc, was rendered pathogenic for guinea pigs and calves by continuous cultivation in media containing ferric salts.

A study of the production of aggressive substances by virulent and avirulent strains and by strains during their avirulent and virulent stages showed that in all cases the amount of aggressive substance produced was the same.

The aggressivity and virulence of cultures of *Clostridium chauvaei* therefore depended on different functions of the bacterial cells.

It was then suggested by Scott[5] that virulent cultures of *Cl. chauvaei* consisted of three parts: (1) living bacterial cells, (2) aggressive substances secreted by these cells and (3) a lethal substance or specific cellular activity of the living cells.

In 1927, following the work of Basset,[6] Leclainche and Vallee,[7] and McEwen,[8] on the use of formaldehyde in the production of blackleg cultural aggressins and bacterins, we prepared a number of lots of blackleg filtrate and blackleg bacterin using formaldehyde as the preservative. In all cases formaldehyde greatly increased the potency of these products. A few filtrates were made using sodium citrate in the preservative solution to assist

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in filtration. Later this salt was added to the culture medium to save time. It was found that all filtrates and bacterins made from media containing sodium citrate were twice as potent as corresponding products made from the same media which did not contain sodium citrate. Similar results are reported in the Kansas State Agricultural Experiment Station Report for 1926-28[9] by the use of ammonium phosphate and potassium tellurite.

These preliminary experiments showed the necessity of further experiments on the action of salts on the production of virulence and of aggressive substances by cultures of *Cl. chauvaei*.

Sixty-eight salts were obtained and the action of these salts on the growth, liquefaction of gelatin, fermentation of carbohydrates, virulence, and aggressin production was studied.

Optimum Concentration

The proper dosage of each of these salts was determined by the use of brain and gelatin media containing 0.5 per cent peptone, 0.1 per cent glucose, and 0.5, 0.05, 0.005, 0.0005 and 0.00005 molar concentrations of the 68 salts. The gelatin medium was sterilized under a vaseline paraffin seal.

These series of salt media were inoculated with 24-hour cultures of *Cl. novyi*, *Cl. welchii* and *Cl. sporogenes*. The amount of growth was determined by an inspection of the turbidity and gas production after incubation for 24 and 48 hours.

In most cases a definite salt concentration was found which produced more growth than the four other concentrations tested. This concentration was called the optimum concentration and this amount was used as the basis for comparative tests.

Two tests on the optimum concentration of salts were made in the case of *Cl. chauvaei* and *Cl. septicus*, using ammonium dihydrogen phosphate and potassium citrate. Both these salts behaved in exactly the same manner as for the three other anaerobes. It was therefore assumed that the optimum concentration obtained for the remaining 66 salts by the use of *Cl. novyi*, *Cl. welchii* and *Cl. sporogenes* would be correct for the two diffidently growing organisms, *Cl. chauvaei* and *Cl. septicus*.

A toxic or inhibitive concentration about 100 times the optimum concentration was determined for most salts.

Ferric chlorid at pH 5.6 and pH 7.0 gave identical growth curves for the five concentrations tested. In both cases optimum growth occurred at 0.0005 molar concentration and the toxic concentration was 0.05 M., thus indicating that the toxicity of this salt

does not depend primarily on the acidity produced by the salt in solution but on the toxic action of the ferric ion.

Growth

The amount of growth stimulation produced by the 68 salts was determined by using beef-heart-infusion broth containing 0.5 per cent peptone and the optimum concentration of each of the salts. This medium was sterilized under seal and inoculated with 24-hour cultures of *Cl. chauvaei*, *Cl. septicus*, *Cl. novyi*, *Cl. welchii* and *Cl. sporogenes*. After incubation for 24 and 48 hours, 5 cc of the culture was removed from below the seal, filtered through cotton and placed in a Hopkins vaccine tube. The amount of sediment, or growth, was determined by centrifugalizing for ten minutes.

Four of the 68 salts (potassium pyruvate, potassium sulfate, lecithin and salmin) increased the amount of bacterial substance of all five organisms. Fifteen other salts (ammonium nitrate, ammonium dihydrogen phosphate, ammonium sulfate, calcium carbonate, ferric citrate, potassium bicarbonate, potassium iodid, potassium lactate, potassium nitrate, sodium pyruvate, creatine, arginine, asparagine, cysteine and glycine) increased the growth of four of the five organisms tested.

Essential Ions

To determine which of these 19 salts were essential for growth, mixtures of the 53 inorganic salts were made in such a way that each of the 20 ions found in these salts was omitted from one mixture. These twenty minus mixtures and a control containing all the 20 ions were added to beef-heart infusion containing 0.5 per cent peptone and sterilized under seal.

These twenty media were inoculated with 24-hour cultures of the five anaerobes and incubated for 24 and 48 hours. The amount of growth was determined by centrifugalizing in Hopkins vaccine tubes. Certain of the ions were found to have greatly reduced the growth when they were omitted. Some ions when omitted increased the growth of the organisms. These were considered as non-essential or possibly toxic in their action on growth. Nine of the ions were found to decrease growth of four or more anaerobes. These ions were again used as the basis of a series of nine minus mixtures and the growth of the five anaerobes in this new series of media again tested. This process was repeated four times, after which only five ions (ammonium,

dihydrogen phosphate, potassium, bicarbonate and pyruvic acid) were found to be necessary for adequate growth of the anaerobes tested. Two other ions (calcium and sulfate) were found to be essential in two of the four series of tests, and are considered as semiessential or valuable adjuvant ions.

The essential nature of the organic compounds, extractives, amino-acids, etc., was determined in a similar series of mixtures omitting one salt. None of these compounds showed any appreciable decrease in growth as compared with growth in a medium containing all the salts. It is therefore considered that none of these substances was essential, due probably to the presence of any essential organic salt in sufficient amounts in the 0.5 per cent peptone used.

Synthetic Medium

Mixtures of the essential ions with amino-acids, lecithin and the nucleo-protein salmin, allowed the growth of *Cl. novyi* and *Cl. welchii* for one generation but no second generation transfers could be obtained in any mixture tried. The failure to develop a satisfactory synthetic medium was probably due to the absence of some necessary amino-acid or other protein substance.

Gelatinolysis

The action of the 68 salts on the liquefaction of gelatin was determined by adding the optimum concentration of these salts to aqueous gelatin containing 0.5 per cent peptone, sterilized under a vaseline paraffin seal. This gelatin medium was not liquefied by cultures of *Cl. chauvaei*, *Cl. septicus* or *Cl. novyi* for three to five days. Four salts (potassium chlorid, potassium hydrogen phosphate, sodium hydrogen phosphate and sarcosin) caused liquefaction to occur in 24 to 48 hours, when the medium was inoculated with *Cl. chauvaei*, *Cl. septicus* or *Cl. novyi*. Twenty-two other salts increased the liquefaction of gelatin by *Cl. chauvaei* and *Cl. novyi*.

Fermentation

The fermentation reactions of the 68 salts were tested in beef-heart infusion containing 0.5 per cent peptone and rendered sugar-free by the use of *Cl. welchii*. This medium was sterilized under seal and later, 1 per cent sucrose, glycerol and salicin were added.

These three sugars were used in preference to glucose, as it had been noted that *Cl. chauvaei* frequently failed to produce acid

in sucrose media when it readily fermented glucose. Similar results have occurred in the fermentation of salicin by *Cl. septicus* and glycerol by *Cl. novyi*.

The optimum concentration of each of the 68 salts was added to sugar-free media containing sucrose. These media were then inoculated in duplicate with a 24-hour culture of *Cl. chauvaei*. The same procedure was taken in the case of salicin, which was inoculated with *Cl. septicus* and glycerol inoculated with *Cl. novyi*. The control cultures which did not contain any added salts were not fermented for three to five days. Eight salts (ammonium dihydrogen phosphate, ferric ammonium citrate, ferric ammonium sulfate, ferrous sulfate, magnesium sulfate, sodium orthophosphate, cystin and tyrosin) stimulated the fermentation of all three organisms, fermentation being determined by removing 1 cc of the culture from under the seal and testing for acidity with brom-thymol-blue.

A mixture of the essential nutritive salts and salts which increased fermentation was made and an efficient sugar-free medium containing the following salts developed:

Peptone	1 to 2 grams
Ammonium dihydrogen phosphate	0.06 "
Potassium bicarbonate	0.05 "
Disodium dihydrogen phosphate	0.17 "
Ferric ammonium citrate	0.2 "
Distilled water	100.0 cc

This sugar-free salt mixture containing 0.5 per cent peptone allowed the ready fermentation of fermentable sugars by *Cl. chauvaei*, *Cl. septicus*, *Cl. welchii*, *Cl. novyi* and *Cl. sporogenes*. In the cases of *Cl. chauvaei*, *Cl. septicus* and *Cl. novyi*, and in many cases with the two other organisms, no growth occurred when non-fermentable sugars were present. This suggests that fermentation in media containing minimal growth-supporting substances, fermentation of fermentable carbohydrates precedes growth; and that the action of the salts which stimulated fermentation is directly on the fermentative powers of the organism, either acting directly on the cell, causing an increased production of hydrolytic enzyme, or acting on the preformed enzyme in the manner of a co-enzyme.

Aggressins

The action of eighteen salts on the production of aggressive substances was tested by adding the optimum concentration of these salts to brain medium containing 0.5 per cent peptone and

0.1 per cent glucose. These brain-salt media were inoculated with *Cl. chauvaei* (strain 53) and incubated at 37° C.

Filtrates from three of these media were made after incubation for 24 hours and filtrates or bacterins from the eighteen media after incubation for 10 days.

The potency of all these products was determined by the use of the neutralization test of Goss and Scott.[10] In this test the aggressivity of the products is determined by titration against blackleg serum. The potency of the blackleg culture is first determined by finding the minimum lethal dose of the virus in a series of three guinea pigs injected with 0.1, 0.2 and 0.4 cc of culture. The potency of the antiserum is then ascertained by determining the protective action of 0.1 cc of anti-blackleg serum. This amount usually protects against 10 to 14 m.l.d. of blackleg culture. One unit of serum protects against one m.l.d. of virus.

In the neutralization test a series of guinea pigs is injected with a dose of (S) units of anti-blackleg serum. Fifteen hours later, these guinea pigs are injected with (V) m.l.d. of blackleg virus and graduated amounts of blackleg filtrate. The least amount (A cc) of filtrate which neutralizes S-V units of serum, thus causing death of the guinea pig, determines the potency of the product. The strength of a 5-cc dose will be $\frac{S\text{-}V}{A} \times 5$ aggressive units, one aggressive unit being that amount of aggressive substance which will neutralize one anti-blackleg unit of serum.

The usual dosages are 15 units of antiserum, 2 m.l.d. of virus and 1, 2, 3, 4 and 5 cc of filtrate or bacterin. If it takes 2 cc of filtrate to activate 2 m.l.d. of virus to kill a guinea pig protected against 15 m.l.d. by the use of serum, then the potency of the filtrate is $\frac{15\text{-}5}{2} \times 5$, or 32.5 aggressive units.

Table I shows the potency of the filtrates and bacterins made from cultures of *Cl. chauvaei* grown in media containing 18 different salt solutions. It is seen that two of the three 24-hour filtrates have considerably lower potencies than 10-day filtrates made from these same media. Nine formolized filtrates and bacterins were made by adding 1 cc of a 5 per cent formaldehyde solution (12.5 per cent formalin) to 9 cc of filtrate or culture. The potency of all formolized products was twice as high as that of the untreated material as was also the case for the single natural aggressin treated with formaldehyde.

Seven bacterins were compared with the corresponding formolized filtrates. Two of these bacterins show potencies greater than

TABLE I—*Aggressive strength of blackleg filtrates and bacterins*

SALT	No.	24-HOUR FILTRATE	10-DAY FILTRATE	10-DAY FILTRATE (FORMOL)	10-DAY BACTERIN (FORMOL)	PATH. P
Ammonium dihydrogen phosphate	1		32.50	65.00		P
sulfate	2				65.00	0
Calcium carbonate	3		21.65			0
lactate	4				32.50	P
Copper sulfate	5		16.50	32.50	65.00	0
Ferric citrate	6		32.50			
ammonium citrate	7		16.50	32.50	32.50	P
sulfate	8		21.65			P
Magnesium sulfate	9		16.50			0
Manganese chlorid	10	16 50 F32.50	32.50	65.00	130.00	0
Potassium bicarbonate	11		32.50			P
citrate	12		32.50	65.00	65.00	P
iodid	13		21.65			0
hydrogen phosphate	14		21.65			
pyruvate	15	21.65 F65.00	32.50	65.00	65.00	0
sulfate	16				32.50	0
tellurite	17		32.50			0
Sodium citrate	18		21.65	32.50	32.50	0
hydrogen phosphate	19				32.50	
pyruvate	20		21.65			0
Zinc chlorid	21		16.50			0
Cysteine	22	21.65 F32.50	21.65	65.00		0
Cystin	23				65.00	
Tyrosine	24				21.65	
Control			21.65	32.50	32.50	0
Aggressin 222	Calf	Phenol	16.5	Formol	32.0	

All potencies given in Aggressive Units (A.U.).
P—Pathogenic; t—slightly toxic; F—formolized filtrate; —increase in aggressive potency.

that of the corresponding filtrates. The five other bacterins had the same potency as the corresponding filtrates.

These experiments suggest that formaldehyde has a specific action on the aggressive substance, increasing its potency by chemical or physico-chemical action. It is shown also that bacterins are not usually more potent than filtrates and that the potency of bacterins depends on the aggressins and not on the bacteria found in suspension.

COMBINED ACTION OF SALTS ON AGGRESSIN PRODUCTION

To determine whether the seven salts which had been found to increase the production of aggressive substances could be com-

bined in such a way as to produce an even more potent product, a number of mixtures of these salts were made and added to brain medium containing 0.5 per cent peptone.

These mineral media were inoculated with *Cl. chauvaei* (strain 53). After incubation for ten days, the supernatant fluid was poured off and treated with 0.5 per cent formaldehyde solution to make a sterile bacterin. The sterility of these bacterins was tested 24 hours later by adding 5 cc of the products to each of two tubes of brain medium. All the bacterins were found to be sterile.

TABLE II—*Potency of blackleg bacterins made from media containing several salts*

BACTERIN	NUTRITIVE SALT	CATALYTIC SALT	AGGRESSIVE SALT	INDIFFERENT SALT	POTENCY BACTERIN (A. U.)	THEORETIC A. U.
1	1	10			130	130
2	1	10	12		260	260
3	1	10	12	22	130a	260
4	1, 15	10	12		260	260
5	1, 15	10	12	22	260	260
6	1, 11	7, 10	12		65a	260
7	1	7	12		260	260
8	1, 11	6			130	130
9	1, 11, 15	6			65	130
10	1			16	65	65
11	1			16, 24	130	130
12	1	10		4	65a	130
13		10		4	65	65
14			12	4	65	65
15	1			4	260	65
16			18	14	65	65
17			18	3	32.5	65
18	1, 11	7		19	130	130

A.U.—aggressive units.

1, ammonium dihydrogen phosphate; 3, calcium carbonate; 4, calcium lactate; 6, ferric citrate; 7, ferric ammonium citrate; 10, manganese chlorid; 11, potassium bicarbonate; 12, potassium citrate; 15, potassium pyruvate; 16, potassium sulfate; 18, sodium citrate; 22, cysteine; 25, ferric ammonium sulfate; 19, sodium hydrogen phosphate.

Table II shows the results obtained from this series of tests. The potency of the products was determined by means of the neutralization test. It is seen that rather peculiar results are recorded in the first seven tests. Table I shows that salts 1 (ammonium dihydrogen phosphate), 10 (manganese chlorid) and 12 (potassium citrate) all produced bacterins having a potency of 65 units. Bacterin 1, containing salts 1 and 10, has a potency of 130 units, and bacterin 2, containing salts 1, 10 and 12, a potency of 260 units. Bacterin 7, which contains salt 7 (ferric ammonium citrate) in place of manganese chlorid (salt 10), also has a potency of 260 units. Bacterin 4, containing salts 1, 10 and 12 as well as salt 15 (potassium pyruvate), still has a potency of 260 units and

similar results are obtained by the addition of salt 22 (cysteine) to bacterins 2 and 4, as is shown by the results in bacterins 3 and 5.

These results suggested that salts might act in different ways to increase the potency of the bacterins. Nutritive salts such as ammonium dihydrogen phosphate might cause an increase in the production of bacterial cells and thus indirectly increase the production of aggressive substances. Other salts might increase the production of aggressive substances without increasing the number of bacteria. These would be purely stimulative or secretory salts; and salts might also act directly on the aggressive substance in a similar manner as had been shown for formaldehyde. These salts would be similar to the fermentative coenzymes.

If this theory were correct, it should be possible to arrange a theoretical potency for all mixtures of salts. It was further considered that as each salt was used in optimum concentration, two salts of one class would have the same effect as one salt. This had been suggested to be the case in bacterin 5, containing two nutritive salts, ammonium dihydrogen phosphate and potassium pyruvate. Salts such as cysteine, which did not increase the potency of single filtrates (table I) should have no effect in mixtures.

The theoretical potencies were determined from a study of table I, which shows that stimulative salts produce bacterins having a potency of 65 units. Bacterins 1 and 2 showed that combinations of two salts might have a potency of 130 units and of three salts of 260 units. It was decided, therefore, that when salts belonging to one class were present, the potency of the product would correspond to 1 cc in the neutralization test, or 65 units. When salts belonging to two classes were present, the potency would be 0.5 cc in the test, or 130 units, and when three stimulative classes were represented, the potency would correspond to 0.25 cc, or 260 units. Indifferent salts added to any of the mixtures were considered to exert no effect.

Eighteen mixtures of salts were studied containing three nutritive salts (ammonium dihydrogen phosphate, potassium bicarbonate and potassium pyruvate); three catalytic salts (manganese chlorid, ferric citrate and ferric ammonium citrate), and two aggressive salts (potassium citrate and sodium citrate). The potency of bacterins made from these eighteen media were compared with the theoretical or expected potencies.

Table II shows that 12 out of 18 (66 per cent) of these bacterins had the expected potency. Three bacterins containing manganese chlorid and phosphates had unexpectedly low potencies. In these three cases there was a heavy precipitate formed by the action of manganese and phosphate. If these three bacterins are omitted from the table, 12 out of 15 (80 per cent) of the bacterins had the expected potencies.

From this study it is seen that the amount of aggressive substance produced by blackleg cultures can be materially increased. A medium containing 1 to 2 per cent peptone, 0.06 per cent ammonium dihydrogen phosphate, 0.05 per cent potassium bicarbonate, 0.03 per cent ferric citrate, and 0.16 per cent potassium citrate will enable the production of blackleg bacterins and filtrates of unusually high potency.

An improvement in the method of preparing meat or liver-piece media was suggested by Dr. L. R. Vawter, who uses small cloth sacks about 1.25 inches in diameter and 3.5 inches long. These sacks are filled with ground meat or liver and are placed in the bottom of 2000-cc flasks, peptone and salts are dissolved in water and poured over the meat sacks. This meat or liver mash medium is then sterilized for the usual three hours at 15 pounds. It will be found that this medium allows a much higher portion of the fluid culture to be poured off without any meat sediment.

Virulence

The action of 23 salts on the pathogenicity of cultures of *Cl. chauvaei* was tested by adding the optimum concentration of these salts to brain medium containing 0.5 per cent peptone and 0.1 per cent glucose. The m. l. d. of 24-hour cultures of *Cl. chauvaei* (53) grown in brain medium was 0.4 cc and in eight of the salts (ammonium dihydrogen phosphate, calcium lactate, ferric chlorid, ferric citrate, ferric ammonium citrate, ferric sulfate, potassium bicarbonate and potassium citrate) the m. l. d. was found to be 0.2 and 0.3 cc.

Of 20 salts tested both for aggressivity and pathogenicity, eight (calcium carbonate, copper sulfate, magnesium sulfate, potassium iodid, potassium sulfate, sodium pyruvate, zinc chlorid and cysteine) had no stimulating effect on either of these functions. Four salts (ammonium dihydrogen phosphate, ferric citrate, potassium bicarbonate and potassium citrate) increased both functions. Four salts (ammonium sulfate, manganese chlorid, potassium pyruvate and potassium tellurite) increased the

aggressivity but had no action on virulence. Sodium citrate also increased aggressivity as an aggressive salt when in mixtures but did not act on virulence. Three salts (calcium lactate, ferric ammonium citrate and ferric sulfate) increased the virulence but had no effect on aggressivity.

Four out of twelve salts that affected aggressivity or virulence increased both functions and 8 (66 per cent) acted on only one or other of these functions.

These results show that the pathogenicity of blackleg cultures does not depend directly on the aggressivity of the cultures. Pathogenicity and aggressin production are two separate physiological processes and are acted upon by different conditions of growth.

These results confirm the theory of the lethal substance or specific cellular activity, suggested by Scott[4] as an explanation for pathogenicity in blackleg cultures.

A virulent culture of *Cl. chauvaei* consists of three parts: (1) living cells, (2) a lethal substance and (3) aggressins produced by the bacterial cells during growth.

Classification of Salts

A comparison of the action of the 68 salts on the five cellular functions studied (growth, gelatinolysis, fermentation, aggressivity and pathogenicity) suggested that these salts could be classified according to their specific effects on these properties.

Linossier,[11] in studying the action of salts on the growth of *Oidium lactis*, suggested that salts could be divided into nutritive salts, which entered directly into the metabolism of the cells, and catalytic salts, which increased the growth of this mold when present in very minute quantities and did not enter into the cellular substance directly.

Four general classes of salts are suggested:

1. *Nutritive salts:* Those salts which stimulate growth. These salts usually cause an indirect stimulation of other cellular functions due to the great increase in the number of bacterial cells produced. The most important of the nutritive salts are those which contain the essential nutritive ions: ammonium, potassium, dihydrogen phosphate, bicarbonate and pyruvic acid.

2. *General stimulating or catalytic salts:* These salts stimulate two or more physiological functions and usually have very little effect on growth, e. g., ferric salts, manganese chlorid.

3. *Specific stimulating salts:* Salts which affect chiefly one of the physiological functions. Gelatinolytic salts (potassium chlorid and sodium hydrogen phosphate). Fermentative salts (magnesium sulfate, ferric ammonium citrate, ferrous sulfate). Virulent salts, such as ferric citrate, ferric chlorid and ferric sulfate, and aggressive salts (potassium citrate and sodium citrate).

4. *Indifferent salts:* Salts which have little or no action on any of the cellular functions.

The combination of nutritive catalytic and specific salts has been mentioned in the production of sugar-free media and of a salt mixture for the production of highly potent blackleg filtrates and bacterins.

Summary

1. A comparison of the growth of anaerobic organisms in media containing 68 salts (53 inorganic salts, 9 amino-acids, extractives, lecithin and nucleoprotein) showed that in most cases there was a definite concentration of these salts which produced optimum growth.

2. A toxic concentration at least 100 times the optimum also was noted. The toxicity of the salts was shown to be independent of the pH.

3. It was shown that certain salts stimulated growth, gelatinolysis, fermentation, or aggressin production, but had little action on other functions.

4. By comparing the action of the 68 salts on the five physiological functions studied (growth, gelatinolysis, fermentation, aggressin production and virulence), it was found possible to divide these salts into four groups: (1) nutritive salts, (2) catalytic or general stimulating salts, (3) specific stimulating salts (gelatinolytic, fermentative, aggressive and virulent) and (4) indifferent salts.

5. No relationship between virulence and aggressivity could be determined.

6. By the use of salts belonging to the nutritive, catalytic and stimulative groups, a sugar-free medium and a salt mixture for the production of aggressive substances were developed.

7. By the use of the aggressive salt mixture and formaldehyde it was possible to produce blackleg filtrates and aggressins having a potency of 260 aggressive units, which is ten times as potent as ordinary blackleg aggressins and filtrates.

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Gestation Period of Martens Confirmed

"The Normal Breeding Season and Gestation Period of Martens" is the title of Circular 107-C, just issued by the U. S. Department of Agriculture, which presents the results of observations by the Bureau of Biological Survey and experiments with martens in captivity, chiefly at the Bureau's fur farm in the Adirondack region. The Bureau's preliminary breeding experiments with martens started in 1913, but it was not until the spring of 1929 that it was able to demonstrate conclusively the exact breeding and gestation periods of these valuable fur-bearing mammals.

The investigators made note of many new and interesting facts regarding the habits of martens, which are reported in Circular 107-C. The circular also includes a summary of recent investigations with martens in other countries. These corroborate the observations by the Biological Survey. Copies of the new circular may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

Wins Hoskins Memorial Medal

Captain Gerald W. FitzGerald, V. C., was awarded the Hoskins Memorial Medal, at the recent graduation exercises of the Army Veterinary School. This medal is awarded by the A. V. M. A. annually to the officer of the Veterinary Corps attaining the highest standing in the class attending the Army Veterinary School. Captain FitzGerald has been assigned to duty in the Office of the Surgeon General at Washington.

ANEMIA IN YOUNG PIGS*

By R. A. CRAIG, *Lafayette, Indiana*

Veterinary Department, Purdue University
Agricultural Experiment Station

The control of diseases responsible for the high death rate and stunted growth in pigs is the most important economic problem in swine production. The breeder or farmer who majors in swine production frequently finds that pig diseases are responsible for the operation of his farm at a loss. In a large percentage of these herds the pigs are so seriously diseased at the time the owner calls a veterinarian, that it is impossible to give a favorable prognosis. As a more favorable prognosis is usually given by men who sell mixed feeds and minerals, their advice as to the general care, ration fed, and treatment of the pigs is usually followed.

TABLE I—*Death rate in young pigs*

SEASON OF THE YEAR	BROOD SOWS	PIGS FARROWED	DEATH RATE PER HUNDRED
Spring	2,013	16,479	24−
Fall	826	5,706	14+

Table I gives the death rate for the period from farrowing to weaning time. The majority of the herds included in the table may be classed as breeding and sanitation herds, as a large percentage of the owners followed a sanitation plan in the management of the sows and their litters. This may be responsible for a lower death rate than has been reported by some writers. The

FIG. 1. Three-week-old pigs. Note the wrinkling of skin accompanying loss of weight.

*Presented at the sixty-sixth annual meeting of the American Veterinary Medical Association, Detroit, Mich., August 13-16, 1929.

greater portion of the ten per cent difference in the death rate in the spring and fall pigs was due to disease, and not to chilling and crushing, although these factors are responsible for a greater part of the death rate in spring than in fall litters. It is of interest to refer to the difference in the death rate for the period between weaning and marketing of the hogs. In the herds that reported, the death rate for this period in the fall pigs was 100 per cent greater than in the spring pigs.

The pigs shown in figure 1 are about three weeks of age. Their physical appearance indicates that they lack vigor, as the small amount of exercise necessary in order to photograph them has produced fatigue. The wrinkled skin shows that the pigs are losing weight or using their subcutaneous fat.

FIG. 2. Survivors of litter shown in figure 1, two weeks older.

The pigs shown in figure 2 are about five weeks of age. They are survivors of the former litter (fig. 1). The heavy death rate, stunted growth, and aged appearance can be attributed to one factor—anemia—which resulted from confinement inside a modern farrowing house during the latter part of March, and month of April.

TABLE II—*Relation of inside and outside conditions to death rate*

CONDITION	PIGS	ANEMIC	DEATH RATE
Inside	146	75	56.0
Outside	130	18	10.6

The relation of inside and outside conditions and anemia to the death rate in pigs between one and eight weeks of age is shown in tables II and III. By inside conditions is meant pens inside of a

TABLE III—*Relation of anemia to death rate*

CONDITION OF PIGS	PIGS	DIED	DEATH RATE
Anemic	93	56	60.5
Non-anemic	184	7	3.8

well-lighted and ventilated farrowing house. By outside conditions is meant pens with concrete floors and open sheds, or individual farrowing-houses for shelter. All pigs that had a red-blood-cell count of 3,000,000 or less, or 3.8 grams or less hemoglobin per 100 cubic centimeters of blood, were classed as anemic.

TABLE IV—*Effect of housing and outside conditions on hemoglobin*

FARROWING HOUSE (GM.)	OUTSIDE PEN (GM.)	PASTURE LOT (GM.)
9.5	7.6	12.7
7.2	4.4	8.9
5.4	5.0	11.3
4.8	5.1	12.4
4.4	5.4	12.1
5.0	6.1	——
4.8	——	——

Table IV gives the average amount of hemoglobin per 100 cubic centimeters of blood in several litters of pigs that were subjected to the different conditions mentioned. The hemoglobin determin-

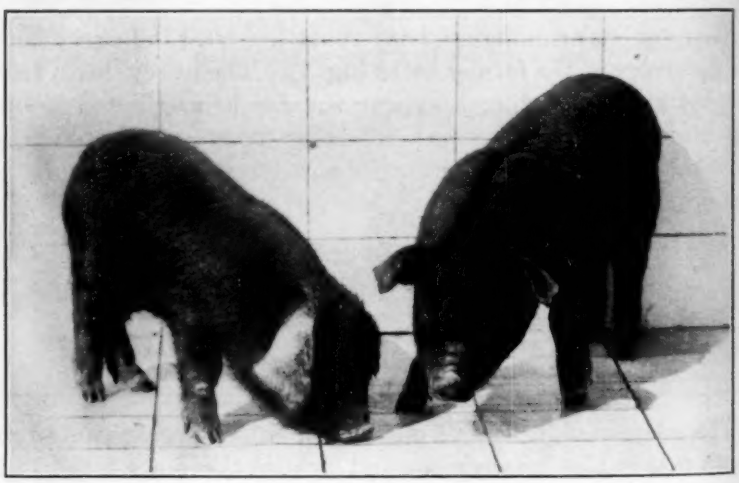


FIG. 3. Two anemic pigs. Smaller pig decidedly anemic.

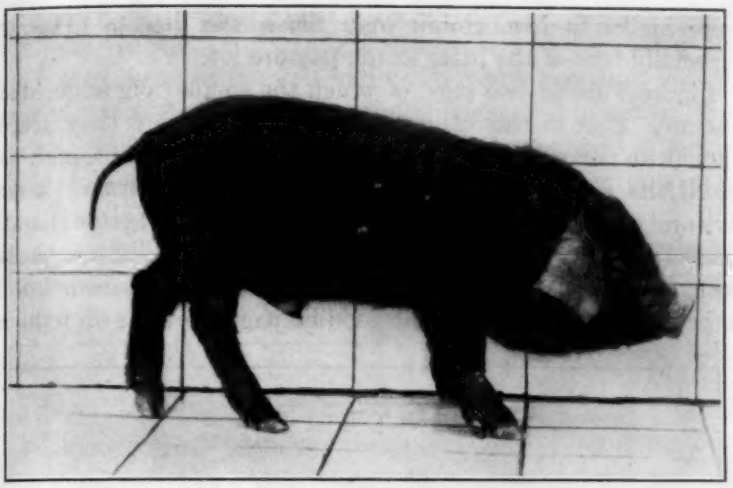


FIG. 4. An anemic pig at 45 days of age.

ations were made at weekly intervals. One litter in the outside pens was decidedly anemic at birth, which accounts for the low hemoglobin content of the blood of this group of pigs at birth and later. There was a decided drop in hemoglobin in all groups of pigs at one week of age. At four weeks of age the outside litters

FIG. 5. A non-anemic pig at 49 days of age.

were higher in hemoglobin than the inside litters. This was especially true of the litter in the pasture lot.

Figure 3 shows two pigs, of which the smaller pig is decidedly anemic. Pigs in this condition usually die before they are old enough to wean. Although the larger pig has anemia and, as a result, its growth and development are below normal, it may live and grow fairly well if the ration and care are better than the average herd receives. Any person who has observed hog management in breeding and farm herds, can not help but be impressed with the effect that good management has on reducing

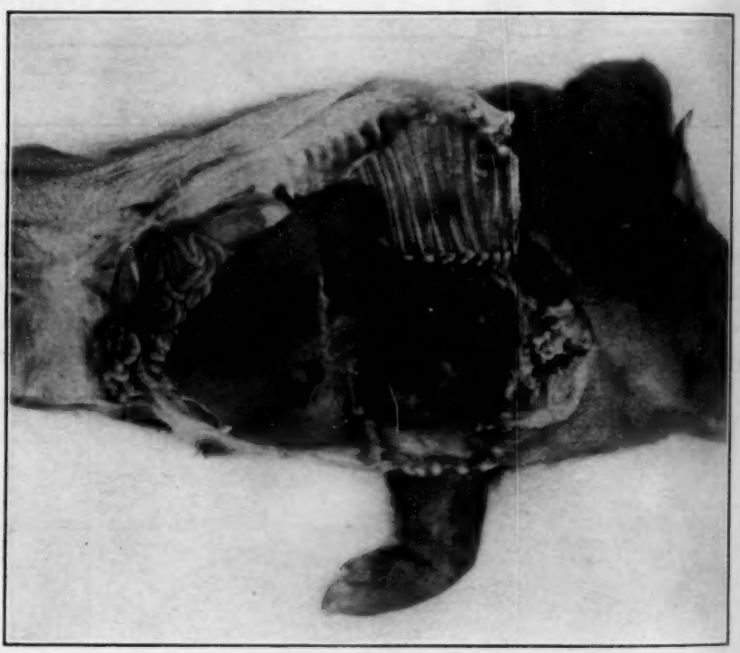


FIG. 6. Postmortem lesions in an acute field case of anemia.

the death rate in pigs. Pig losses can be attributed largely to poor management.

Figure 4 shows an anemic pig 45 days of age. It shows the stunted growth, aged appearance, and weakened vitality that occur in anemia. This pig would not live very long if turned into a pasture lot with a bunch of thrifty pigs.

Figure 5 shows a non-anemic pig 49 days of age. It was farrowed outside, in May, about two months later than the anemic pig (fig. 4). With the exception of the outside conditions, it was given the same care and feed as the anemic pig.

Figure 6 shows an autopsy of a field case of anemia in a pig four weeks of age. Outbreaks of anemia accompanied by a high death rate occur in late-fall and early-spring pigs that are confined in poorly-lighted and ventilated barns and in modern hog-houses. Injury from anemia occurs in pigs confined in modern hog-houses one week or longer, if not allowed to run outside, or given access to direct light from open windows or doors. The common symptoms observed by the breeder or farmer are thumps and white scours. Fatty degenerative changes in the liver and

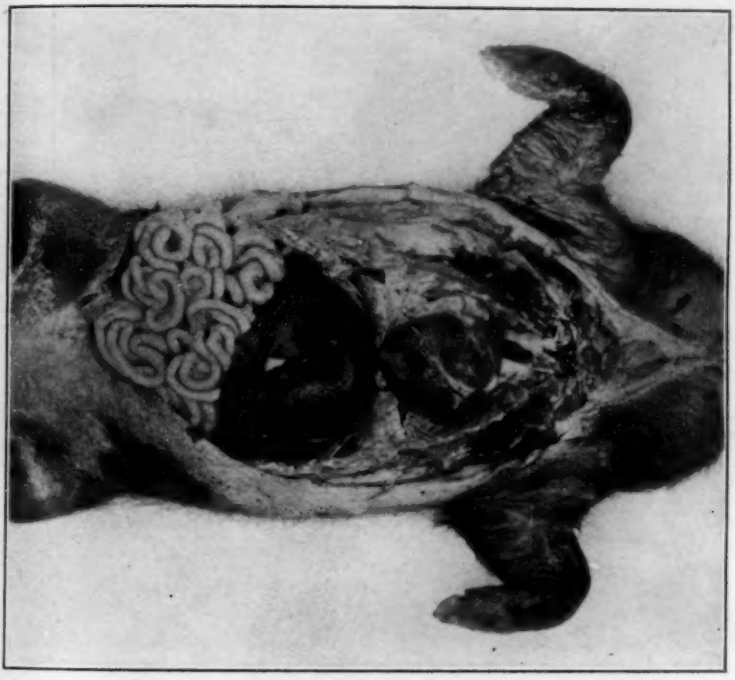


FIG. 7. Postmortem lesions in an experimental case of anemia.

later cirrhosis, a large, dilated heart, pneumonia and cachexia are prominent lesions of disease. You may compare the lesions shown by this field case of acute anemia with the lesions shown by one of the pigs in the anemia experiment (fig. 7).

Pale, thin blood, a dilated, flabby heart, and large mottled or cirrhosed liver are the most constant gross lesions in anemia in pigs. Serous fluid and masses of fibrin are very commonly found in the abdominal cavities of pigs that die of anemia.

FIG. 8. Carcasses of anemic (left) and non-anemic (right) pigs.

A comparison of the carcasses of the anemic and non-anemic pigs, as shown in figure 8, emphasizes the pathology of the disease. The large heart crowds the lungs; the large liver and spleen hide the stomach; and there is very little alimentary matter in the intestines.

Figure 9 shows the grayish-yellow areas in the liver which give the organ a mottled appearance. Although the extent of the degenerative fatty infiltration varies, it is a constant lesion in the well-established case of anemia.

An anemic pig is highly sensitive to inoculation with *Actinomyces necrophorus*. The pig shown in figure 10 was inoculated

TABLE V—*Effect of housing and irradiation with arc lamp on hemoglobin*

AGE OF PIGS (DAYS)	COMMON GLASS (GM.)	COREX D GLASS (GM.)	IRRADIATION (GM.)
1	13.7	9.1	11.3
7	7.4	6.2	6.7
14	6.9	5.1	5.4
21	6.1	4.3	4.1
28	5.0	4.7	——
35	5.4	4.8	——
42	5.7	5.5	——

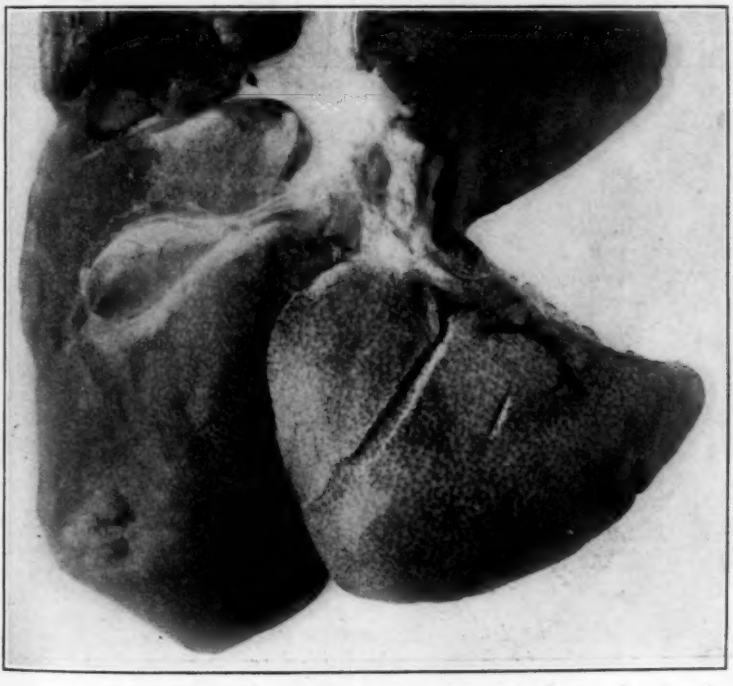


FIG. 9. Liver from anemic pig.

with a suspension of necrotic material from bull-nose lesions in a young pig. Non-anemic pigs, inoculated with the same material, showed nothing more than a slight inflammation at the point of inoculation from which they recovered within three or four days.

Table V is a summary of our studies of the relation of light to anemia. One-half of several litters farrowed and retained in a central farrowing-house were divided into three groups. Two of these groups were exposed 30 to 35 hours per week to filtered sun's rays in small houses enclosed in common glass and Corex D glass which gives a longer spectrum than common glass. The third group was irradiated with a carbon arc lamp equipped with

TABLE VI—*Effect of feeding liver meal to brood sows, and liver extract to pigs, on hemoglobin*

AGE OF PIGS (DAYS)	LIVER MEAL (GM.)	LIVER MEAL + WHEAT EMBRYO (GM.)	LIVER EXTRACT (GM.)
1	12.5	12.6	13.5
7	7.0	7.1	7.5
14	4.5	5.2	4.8
21	4.3	4.2	4.0
28	3.8	3.4	4.1
35	4.0	3.6	——
42	5.1	4.0	——

FIG. 10. Pig inoculated with necrotic material from bull-nose lesions in a young pig.

sunshine carbons, four hours daily. There was very little difference in the hemoglobin content of the blood of the controls and the pigs in these three groups. The amount of hemoglobin is expressed in grams per 100 cubic centimeters of blood.

Liver meal and wheat embryo, fed to brood sows throughout the gestation period and after farrowing, did not prevent anemia in their pigs. Liver extract given in two-gram doses, daily, to pigs one to seven days of age and older, did not prevent anemia.

TABLE VII—*Effect of feeding ferric iron on hemoglobin*

AGE OF PIGS (DAYS)	HEMOGLOBIN OF PIGS FED IRON (GM.)	HEMOGLOBIN OF CONTROLS (GM.)
1	11.1	10.7
7	8.4	6.6
14	11.0	5.8
21	11.1	5.2
28	9.4	4.9
35	9.4	5.1
42	9.0	5.3

The pigs that received the iron were divided into three groups. One group was given five cubic centimeters of a five per cent solution of dialyzed iron; a second group, 10 milligrams of pure iron in the form of ferric chlorid; and a third group, 10 milligrams of ferric citrate plus 10 milligrams of copper sulfate. Anemia did not develop in the pigs that received the daily doses of iron.

L. P. Doyle, F. P. Mathews and R. A. Whiting are responsible for the experimental data that I have summarized in this paper. Our study of pig diseases was begun in 1924. One hundred and twenty litters, numbering about 1200 pigs, were used in these experiments.

DISCUSSION

MR. L. P. DOYLE: This paper brings out three things that are important from a practical standpoint: (1) Anemia in young pigs is a definite disease and is marked by characteristic symptoms and lesions; (2) the incidence of anemia in pigs is much higher where the pigs are kept under inside conditions than where pigs are kept under outside conditions; and (3) anemic pigs are markedly susceptible to inoculations with material containing certain microorganisms.

Sometimes anemia has to be distinguished from symptoms that result from other causes. But, the lesions of the disease, such as the pale blood, the pale muscles, the peculiar fatty degenerative condition in the liver, and particularly the large flabby heart, distinguish this disease from other ailments of pigs.

The fact that the disease is much more prevalent under inside conditions than outside conditions furnishes a very satisfactory explanation for the inability of hog-raisers satisfactorily to produce pigs in central hog-houses and in barns.

As regards the methods available for preventing anemia in pigs, we might review two of the slides that Doctor Craig showed. These slides show a striking

difference in the hemoglobin content of the blood of pigs kept outside in pasture lots, as compared with the pigs kept inside. During experiments which extended over three years, severe anemia was found to be from four to six times as prevalent in pigs kept inside as it was in pigs kept in dry lots outside and given the same kind of feed.

Another slide shows the results obtained by feeding iron to the pigs. The iron was fed directly to the pigs, starting at one day of age.

You might ask if we noticed any difference when we added copper to the iron. We did not. The addition of copper sulphite to the iron did not produce any beneficial effect in addition to what the iron alone produced.

Feeding the iron in the form of ferric chlorid, prepared by treating pure iron wire with hydrochloric acid, produced practically the same effects as the feeding of copper and iron.

DR. W. A. AXBY: What was the method of administering the iron in these small pigs?

MR. DOYLE: The iron was administered in solution by means of a dose-syringe—each pig was given a small dose each day.

DR. F. E. STILES: How long do you continue giving the iron?

MR. DOYLE: We find that pigs recover from anemia spontaneously, beginning when five to seven weeks of age. So we kept up the feeding of iron throughout the nursing period. We feel quite certain that the fact that the pigs begin to eat has a great deal to do with the recovery from anemia. Many of these anemic pigs die, however; and many others are permanently damaged.

DR. B. A. BEACH: In those pigs that were not under outside conditions, in a dry lot, were the conditions identical, aside from the fact that the outside pigs, of course, were outside? Wasn't there a chance of them getting anything by way of the digestive tract that the inside pigs did not get?

MR. DOYLE: The conditions were as nearly identical as it was practicable to make them. All of the pigs, those kept outside as well as those kept inside, were kept in pens provided with concrete floors. The same kind of feed and litter were supplied to all lots.

DR. BEACH: Did I understand that the pigs in inside lots had plenty of sunshine through window glass? Did it differ from the inside lots or did the inside lots get that?

MR. DOYLE: The pigs which were kept inside were kept in a well-lighted house in which the windows, made of ordinary window glass, were always kept closed. There was a separate experiment in which some pigs were kept under ordinary window glass, while another group was kept under so-called Corex D glass. There was found to be no appreciable difference in the hemoglobin content of the blood of the two groups of pigs.

DR. H. C. H. KERNKAMP: Our experience with this so-called anemia, at the University of Minnesota, dates back to about 1920. My service there began six years before, and it was my privilege to autopsy about all of the pigs that died on University Farm during this period. The records do not indicate that prior to said date I observed this disease.

In 1920, a number of pigs were brought to the laboratory for examination and invariably we observed a condition which, for lack of a better name, we called fibrinous myo- and epicarditis. After two or three cases were observed, a bacteriological investigation of them was made and each time we failed to isolate any bacteria. I thought possibly the proper culture medium was not being employed, with the result that various culture media were utilized, and I always failed to isolate bacterial organisms.

We are in quite close touch with the Medical School and frequently submit material for examination. I took two of these pigs over there one day and showed them my findings. Immediately they came back and said, "Have you made a bacteriological examination?" "Yes." "What did you isolate?" "Nothing." "Well, go back and try it again. This is typical of an infectious disease." Needless to say, we failed to isolate any organisms.

Now, I want to say that as far as my knowledge goes, we were raising these pigs about the same as had been done since 1914. In Minnesota we must keep the pigs indoors sometimes until the middle of April, and we are attempting to farrow them as early as we can. We like to grow good barrows, get them into

the International, and go home with the ribbons. In order to do this, we must farrow them early.

It was about the same year that some of our practicing veterinarians over the State would inquire about and send in specimens of similar conditions. The following year there were more cases. In 1926, at University Farm, we did not observe a case. Again they appeared in 1927 and more of them in 1928 and 1929.

In the first cases that came to our attention the past spring another peculiar pathological change was noted. The pericardial sac was filled with blood, a typical hemopericardium. We passed this as a rather interesting case, thinking that probably we would not see another one just like it in a long time. To my surprise, the following day, another pig was brought in for examination. There was no evidence of scours, or loss of fat, no wrinkling of the skin or rough hair, and the pig was in good condition. Again, a typical hemopericardium was present. We again attempted bacteriological cultures and again failed to isolate bacteria. Five pigs from this litter all showed the same condition.

It was in the spring of 1925 that I was associating the disease with some sort of thyroid derangement. In consequence, we administered dessicated thyroid gland in doses of from three to five grains every other day. We observed these clinical cases very closely and could see them improve and approach the normal. Not all cases improved, however, but approximately fifty per cent recovered. This was gratifying, although possibly not associated with the thyroid extract *per se*. I cannot explain the effect it produced, except that since we were using just the dessicated thyroid gland it may have contained some of the elements that go toward stimulating the hemopoietic system.

We tried the same treatment again this spring and some pigs recovered. I think more died than recovered. We have also used iron citrate in two-grain doses, administered in capsules, and likewise about fifty per cent recovered and fifty per cent died. A commercially prepared liver preparation was tried and the results were about the same. About fifty per cent lived and fifty per cent died.

The condition is increasing in our state. This year more veterinarians have reported the occurrence of this disease.

DR. HESS: Have you ever tested the hemoglobin of the brood sow? Or have you tried feeding iron to the sows?

MR. DOYLE: We always found the hemoglobin of the sows to be normal in amounts. We had a few litters of pigs that were anemic at birth. The mothers of these pigs, however, were not anemic at the time of farrowing.

As to preventing the disease by feeding the sow, we have not been able to prevent the disease in pigs by feeding the sow iron or liver tankage if the pigs are kept inside all the time. We feel quite certain that it is possible to influence the hemoglobin content of the pig's blood at birth by the way the sow is managed but it seems to be a hard matter to prevent anemia from developing in these pigs, if they are kept inside.

Omaha, Nebraska, Sky-Line, Union Pacific System.

THE VETERINARIAN AND THE SILVER FOX INDUSTRY*

By J. E. SHILLINGER, *Washington, D. C.*

Biologist, Bureau of Biological Survey,
United States Department of Agriculture

The silver fox is the most prominent of the various species of animals raised in captivity for fur. During the past thirty years there has been a spectacular development of this particular form of agricultural pursuit, and a brief consideration of figures relating to this industry will give an idea of its present status. In the United States and Alaska there are approximately 5,000 fur-farmers, the majority of whom are raising silver or blue foxes. The total investment in the business is between $20,000,000 and $25,000,000. The Dominion of Canada Bureau of Statistics states that there are 3,067 fox farms, representing a value of $18,355,423 in that country. The greatest achievement in specializing in the growing of silver-fox fur has been accomplished by an organization operating six ranches in Wisconsin, the largest producers of silver-fox pelts in the world. During the season of 1928-29, 7,600 pelts were sold, yielding a return of a little more than $1,300,000, an average price of about $171 having been received. The highest price received for a single pelt at the winter sale of the New York Auction Company last winter was $850. In the United States and Canada during 1928-29, about 40,000 silver-fox pelts were offered at the various auction companies, and those sold directly to raw-fur buyers would bring the total to approximately 70,000 skins.

Raising of foxes under controlled conditions is a permanent agricultural development. Profits that compare favorably with those derived from other similar enterprises can be obtained if the same business-like methods are applied. The newness and the rapid development of the industry have left many points of specific information wanting. Foxes in captivity present not only all the usual problems of animal care and management as do domestic live stock, but coupled with this are the difficulties met with in maintaining wild animals in confinement.

Before the veterinarian can most effectively deal with the disease situation on a fox farm he must be acquainted with the

*Presented at the twelfth annual meeting of the Pacific Northwest Veterinary Medical Association, Vancouver, B. C., July 15-17, 1929.

general methods of keeping these animals. Information on this subject is steadily increasing in volume, and veterinarians are in a position to determine the practicability of certain methods of handling foxes, equipment used, and treatments applied. For present considerations the conditions on fox farms that bear a relationship to the veterinarian may be dealt with under the following topics: Housing, sanitation, restraint, surgery, feeding, and breeding, with particular reference to pelage.

Housing

Methods of constructing fox-pens and dens have undergone a process of evolution since the industry began. Formerly it was often the custom to confine a pair of foxes in limited inclosures, some being as small as 8 by 16 feet. This practice has given way to the use of larger pens, which aid in promoting hygienic conditions and an improvement in the general well-being of the animals. The freedom afforded by the increased area for exercise has a noticeable beneficial effect on the animals' health as well as on the quality of their fur. Most of the new pens being constructed now are made approximately 50 or 60 feet square. In addition to the breeding pens, most fox farms provide a large inclosure with no shelter other than a roof for the animals to use in protecting themselves from rain. The purpose of these inclosures, which may vary in size from one to 80 acres, is to hold foxes that are to be pelted. The exposure to cold with no protecting dens and the opportunity to run about freely over a large area induces the development of fur of maximum quality.

Inasmuch as foxes in the wild state live in dens under rocks or in burrows in the ground, many of the earlier breeders constructed underground dens, often at considerable expense. These were built of wood, brick, or concrete. This method has given way to the use of a form of house or kennel above ground. The essential features of their construction are double walls or a removable nest box within the outer structure having the entrance arranged as a chute several feet long. This should be set at right angles to the den so as to break direct currents of air and make the interior dark. These principles of construction are embodied in the dens built on practically all ranches at present. There are, however, numerous modifications, some of which may have definite value in certain localities, and others being merely fancied advantages but actually serving no practical purpose.

Sanitation

Hygiene and sanitation for fox farms are not unlike those prescribed for other animals kept in small inclosures. While the same general principles apply, a knowledge of the specific ailments of these animals is necessary for the best application of the basic rules. Along this line one of the most troublesome conditions to be dealt with is that of ridding the premises of parasitic worm eggs and larvae. This situation is similar to that encountered in poultry runs and dog kennels. With the usual style of construction of fox pens, however, it is more difficult to move them to new locations. The various suitable chemical agents are expensive and heat by means of gasoline torches is laborious to apply. Lungworm eggs are especially resistant. Many ranchers follow the practice of periodically removing the polluted soil in the pens, replacing it with fresh earth, preferably of a sandy nature, and using the chemical or heat methods of disinfection in the dens only.

Breeding pens on a fox ranch should be so constructed that no water from one pen will drain over another. The pens should be placed at least 10 feet apart to lessen the danger of spreading disease. Every fox farm, regardless of size, should have a few pens built for hospitalization of all sick or suspected cases of infected animals, located several hundred feet from the main ranch. Since it is an instinct in foxes to conceal as far as possible all symptoms of illness, it is a practice on the more modern ranches to quarantine new stock coming on to a ranch and all animals that have been exposed to possible sources of infection, such as those at fox shows.

Restraint

Among the first things to be learned by anyone whose occupation brings him in intimate contact with foxes is how to become familiar with proper means of restraint and of handling these animals. Their nature when caught may well be considered a blend of the ferocious qualities of a vicious dog and the proverbial cunning of the fox, combined with a speed and strength seldom encountered in other animals of comparable size. Severe lacerations of the hands and other parts of the body are frequently suffered by those not extremely cautious. Variously designed tongs for catching and holding foxes, and speculums, gags, and other instruments as aids in treating them are available, and if used as they are intended will protect the operator from harm.

Care must be exercised at all times, and it should be borne in mind that if the legs are not properly restrained, as well as the teeth, the sharp claws of the feet can inflict painful wounds. A few pen-raised foxes become reasonably tame and will approach within reach of human beings. One should not be deceived into believing they are thoroughly harmless, for it is exceedingly rare that even these apparently docile animals will not resent being picked up.

Surgery

Foxes do appear to be particularly susceptible to pyogenic infections. Bad cases of abscesses and sloughing of tissues and even generalized pyemia frequently follow slight wounds. If vaccine or other treatment is administered hypodermically, intramuscularly, or intravenously, special care must be exercised to prevent bad results from the operation. Similar diseased conditions often follow wounds inflicted by one fox upon another by the teeth.

Attempts are often made to control vicious foxes by cutting off a portion of the canine teeth or tusks. By filing a deep groove around the teeth at the desired place they can be broken off with-without shattering them. Aside from dressing wounds, cutting off dangerous teeth, and amputating badly mangled limbs, there is little call for surgical attention on fox farms.

Feeding

In the selection of food for foxes it is to be recalled that they are carnivorous animals. In the wild they subsist largely on small animals, birds, fish, insects, and a limited quantity of vegetable matter. Just what modification of their diet in the wild will ultimately be found best for them under confined conditions is not definitely known. A wide range in the materials used and the proportion in which they are given is found in rations fed on various ranches where successful fox-raising is conducted. However, certain general rules for feeding foxes are recognized.

The consensus of ideas is that meat should compose from 50 to 60 per cent of the diet and the remainder should be made up largely of cereals, with some vegetables added. The ration should be palatable and of a form readily digestible. Sudden changes in the kinds of feed or in the proportion of the various ingredients are to be avoided. Practically all animal tissues can be used, but fat is not relished and if excessive quantities are used

harm may result. All the glandular organs are especially desirable. If rabbits and certain other small animals are used, care should be exercised to prevent infestation with tapeworms of which these animals may be the secondary host. Fish and other marine animals are recognized as being responsible for infestation of foxes with pathogenic flukes.

It is customary to give more feed and a larger proportion of meats prior to and during the breeding season, and ample rations should be given to females during the gestation and lactation periods. At this time it is particularly necessary to supply foods with liberal quantities of the various vitamins and mineral matter also. A few years ago it was not uncommon to see definite evidence of rickets on many ranches, but these cases have become rare. Cod-liver oil is widely used by fox breeders for the prevention of this condition. Milk is a well-balanced food, but it is expensive for general feeding. Young foxes make the best use of this product. Male foxes, after the mating season, and females, after the young have been weaned, need be fed only once a day.

Pelage and Breeding

Since the coats of these animals represent their individual worth, it is important that they be of the best quality. A veterinarian should possess some knowledge of fur quality, as the general appearance of the fur is of diagnostic value. Since the breeding of the animal, as well as the health, is portrayed through the appearance of the pelt, a study of the pelage is essential. The animal should be evenly furred all over and the hairs should be reasonably long. The guard hairs should be long, fine and silky in texture and sufficiently abundant to obscure the view of the underfur, giving the coat a lustrous, clear appearance. The underfur should be of ample density, free from woolly or matted condition, and the darker the better.

A rusty brownish tinge in the guard hairs or a light grayish shade of the underfur is especially undesirable. As these characteristics are observed on the same ranches where conditions are uniform and where animals of excellent pelts are found, they are probably due to causes other than exposure to sunlight and the nature of the feed. The reason may be found in the ancestry of the respective foxes, but more study is necessary on this subject before positive statements can be made.

The term "samson" is applied to foxes devoid of the long straight guard hairs and bearing only an inferior woolly underfur.

While the real cause of this condition is not definitely known, it may be attributable to certain hereditary factors, but it might be influenced also by other conditions. Certainly it is inadvisable to choose such foxes as breeders or those with a rusty tinge or other undesirable qualities in their fur.

In the selection of breeding stock only those of the choicest type and quality of fur as well as those from prolific ancestors should be considered.

One of the difficulties experienced on many fox ranches is the slow rate of increase. Selection of animals of good fur qualities from prolific families is primarily a matter for the fox-raiser to handle, but the veterinarian should be in position to advise the rancher on methods for preventing the present low rate of reproduction. There are many animals that fail to breed or are sterile. Some females will neglect the young or even deliberately kill them. It is frequently possible to raise fox pups on domestic cats that have given birth to young at about the same time, but the practice is generally attended by heavy loss.

There are doubtless many reasons for lack of productivity in foxes. Not only do they suffer from all the physical defects that interfere with reproduction among domestic live stock, but they are under the added handicap of being an essentially wild animal under close confinement. During the breeding and whelping season only the necessary attendants should be allowed to enter the premises and all noises or disturbances in the neighborhood should be avoided. It must always be borne in mind that the fox is a highly nervous animal and special care must be exercised to avoid unnecessary excitement.

The breeding of foxes is ordinarily a monogamous process, but some individuals will tolerate polygamous mating. This latter system should not be attempted by a novice. Litters vary from one to ten pups with a probable average of four to five. Estimates for the entire country indicate that less than two pups per pair of adults are raised to maturity. "Infant mortality" among foxes is second only to that occurring among certain other wild animals kept in captivity, such as those maintained in zoological gardens.

Conclusion

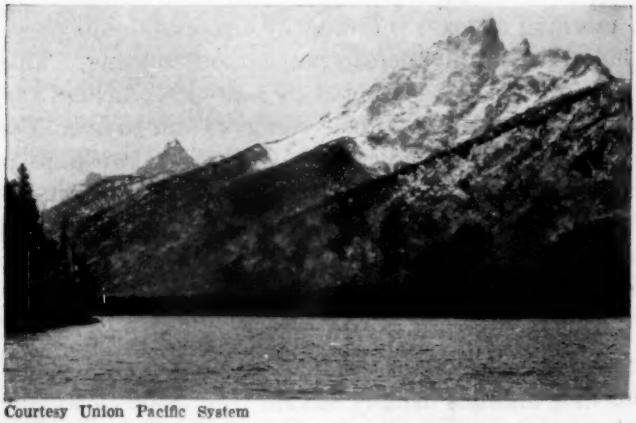
The average price of a silver-fox pelt is between $100 and $300, and breeding animals usually sell for from $500 to $2,000 a pair. Animals representing such values should furnish a fair source of

revenue to the veterinarians. It is true that no routine procedure for treating many of the conditions met with on fox ranches can be outlined, and the success will depend on the resourcefulness of the individual veterinarian. The industry of fur-farming under controlled conditions is new, and our contemporaries in the research field as well as the practicing veterinarians can help to establish many of the fundamental principles that will be used in future years. Those who encounter unusual conditions should make their experiences known through the press and at professional meetings. An attitude of professional cooperation in the exchange of ideas gained through observations will aid in building up a system of related facts that may be used for our scientific guidance. Capable veterinary services can be made as useful to fox ranchers as to those engaged in other branches of animal production.

STATE MEMBERSHIP STRENGTH

The most recent compilation of membership in the A. V. M. A. by states shows the following ten states to be at the head of the list in the order named. The number of members in each state is given:

Pennsylvania	342
California	324
Iowa	303
Illinois	275
New York	267
Ohio	266
Minnesota	199
Michigan	193
Indiana	175
Texas	146



Courtesy Union Pacific System

Grand Teton and Jenny Lake. Grand Teton National Park, Wyoming

AN INTRADERMIC TEST FOR THE DETECTION OF SALMONELLA PULLORA INFECTION

By B. A. Beach, Clayton Holmes *and* C. R. Strange

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Ward and Gallagher,[1] in 1917, published their results with an intradermic test for the detection of white diarrhea infected hens. They considered this test of sufficient promise to warrant further trials. They used a killed culture grown for about a month, carbolized, and held several weeks before use. In the hands of these investigators the ophthalmic, palpebral and subcutaneous tests all failed to cause a reaction.

A report by Scherago and Benson,[2] in 1919, led to the conclusion that the pullorin test was so inconsistent as to be worthless.

Fuller,[3] in 1923, reported that the intradermal test was easier to perform than the agglutination test and detects a large percentage of infected individuals, but that it does not detect them all in heavily infected flocks. He stated that "only a small percentage of non-carriers react to the test."

Burnett,[4] in 1925, stated that, while the pullorin test had not been extensively used, it appeared to have some merit.

Graham,[5] in 1925, in reporting on a comparison of the agglutination and pullorin tests, stated that his results had not eliminated pullorin as a diagnostic agent.

Graham, Tunnicliffe and McCulloch,[6] in 1927, stated that neither the agglutination test nor the pullorin test is a perfect procedure and conclude as follows: "The results with the intradermic test are quite as consistently in accord with the presence or absence of the specific infection as is the agglutination test . . . ."

Edwards and Hull,[7] in 1927, declared that "From the data presented it seems that the agglutination test is a much more reliable method of testing fowls for *Bact. pullorum* infection than the intradermal test employed in this study."

Stafseth and Thorp,[8] in 1928, concluded that the pullorin test is inferior to the agglutination test.

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Investigators at the Storrs Experiment Station,[9] in 1928, working with 80 hens, 40 of which had been repeatedly positive to the agglutination test and in like manner the other 40 negative, found that these groups of hens, when tested twice with pullorin, failed to check with a desirable degree of accuracy.

Bushnell,[10] in 1928, stated that the pullorin test, in its present state of development, cannot be recommended to replace the agglutination test.

An experiment conducted by the writers with 57 hens gave results similar to those cited above. We used both the common cellular pullorin and one made by growing the organisms in broth and removing the cellular content by filtration (pullorin filtrate).

The injections were made into the skin of the wattle, the pullorin filtrate into the left wattle and the cellular into the right. Care was exercised to get the pullorin between the layers of the skin and not in the closed sac. This is attended with difficulty in some hens, especially those that are not in good physical condition. A small white bleb which remained on the wattle was considered to be ideal. Two to three drops of pullorin was injected 24 hours before slaughter, at which time blood for the agglutination test was drawn. Bacteriologic examination of the ovaries was made immediately after slaughter.

The plan of procedure was as follows: The feathers were removed after scalding in hot water (70°-75° C.). The abdominal cavity was opened with sterile instruments and the visceral organs removed. The ova were then pinched off with sterile forceps and placed on infusion agar slants. In a few instances the ova were ground in sterile sand, a little sterile salt solution added, filtered through gauze, and sown on agar slants by means of pipettes. The growths obtained were typed on sugar solutions; dextrose, saccharose, lactose and maltose were utilized.

Of the 57 hens used in this experiment, 30 (52.6 per cent) were infected as shown by bacteriological examination at the time of slaughter. Of the infected hens 9 (30 per cent) reacted to the pullorin filtrate; 8 (26.6 per cent) reacted to the cellular pullorin; 18 (60 per cent) reacted to the agglutination test. Of the 27 non-infected hens there were no reactions with the pullorin filtrate, 6 (22.2 per cent) reacted to the cellular pullorin, and 3 (11.1 per cent) to the agglutination test. A summary of the results is presented in table I.

TABLE I—*Comparison of agglutination test with cellular pullorin and pullorin filtrate*

	Hens	Reacted to Pullorin Filtrate		Reacted to Cellular Pullorin		Reacted to Agglutination Test	
		Number	%	Number	%	Number	%
Infected	30	9	30	8	26.6	18	60.0
Non-infected	27	0	0	6	22.2	3	11.1

It is evident that the pullorin test, in its present stage of development at least, is not so accurate as the agglutination test.

In an endeavor to obtain a more efficient diagnostic agent for the detection of carrier hens, a pullorin filtrate was prepared; the technic of preparation follows. A 48-hour culture of *Salmonella pullora* in pork-infusion broth was filtered through a Berkfeld. The filtrate was concentrated at a temperature between 55° and 60° C. to approximately one-third of the original volume. Five-tenths of one per cent phenol was added as a preservative. The results obtained with this pullorin, designated as lot 1, are as follows:

Of 50 hens used in this experiment, 33 (66 per cent) were infected as shown by bacteriological examination of the ovaries at the time of slaughter. Of the 33 infected hens, 23 (69.6 per cent) reacted to both tests. Twenty-nine (87.2 per cent) reacted to the pullorin test. Twenty-five (75.7 per cent) reacted to the agglutination test. Of the 17 hens in which pullorum infection was *not* found in the ovaries, 9 (52.9 per cent) reacted to the pullorin test, and 12 (70.5 per cent) reacted to the agglutination test. These results are set forth in table II.

TABLE II—*Comparison of lot 1 pullorin tests with the agglutination tests*

	Hens	Reacted to Pullorin		Reacted to Agglutination Test		Reacted to Both Tests	
		Number	%	Number	%	Number	%
Infected	33	29	87.2	25	75.7	23	69.6
Non-infected	17	9	52.9	12	70.5	7	41.1

By the use of this experimental pullorin designated as lot 1, 87.2 per cent of the infected hens was detected, as compared with 75.7 per cent by the agglutination test. On the other hand, of the 17 non-infected hens tested, 9 (52.9 per cent) reacted to this

pullorin, and 12 (70.5 per cent) to the agglutination test. The percentage of the infected hens detected by this particular pullorin approaches satisfaction, if this one trial is used as a criterion. The number of non-infected hens which reacted, however, is entirely too high to be practical, if this pullorin were used to eliminate the infection from flocks. When used as an agent to locate infected flocks, however, it proved to be more satisfactory.

The results referred to above were encouraging enough to warrant further investigation. Accordingly another lot of pullorin, designated as lot 2, was made in a manner similar to that of lot 1, except that it was concentrated to approximately one-third the original volume.

Forty hens were selected to test pullorin 2. Twenty-three (57.5 per cent) were infected, as shown by bacteriological examination. Of these 23 infected hens, 16 (69.5 per cent) reacted to both tests; 21 (91.3 per cent) reacted to the test with pullorin 2; 18 (78.2 per cent) to the agglutination test. The remaining 17 hens failed to reveal ovarian infection. Of these, 11 (64.7 per cent) reacted to pullorin, 6 (35.2 per cent) reacted to the agglutination test, and 5 (29.4 per cent) reacted to both tests. The results are presented in table III.

TABLE III—*Results of pullorin (lot 2) and agglutination tests*

	HENS	REACTED TO PULLORIN		REACTED TO AGGLUTINATION TEST		REACTED TO BOTH TESTS	
		NUMBER	%	NUMBER	%	NUMBER	%
Infected	23	21	91.3	18	78.2	16	69.5
Non-infected	17	11	64.7	6	35.2	5	29.4

By the use of lot 2 experimental pullorin, 91.3 per cent of the infected hens was detected, as compared with 78.2 per cent by the agglutination test. On the other hand, 11 (64.7 per cent) of the non-infected hens reacted to this particular pullorin as against 6 (35.2 per cent) to the agglutination test. Again the number of infected hens detected by this pullorin is highly satisfactory. Unfortunately, with the increase of the number of infected hens detected, there was a corresponding increase in the number of non-infected hens which reacted.

SUMMARY

Previous work done at this and other experiment stations has shown the agglutination test to be very erratic. In one series of

38 hens tested, only five gave consistent results. In another series there was disagreement in 44 per cent of the hens tested by three different laboratories. In another group of 54 hens tested six times, there was disagreement in eleven. At the present time the agglutination test is used largely as a flock test; that is, if reactors are found, the owner is advised to procure hatching eggs or chicks from flocks that are clean and eventually dispose of the entire infected flock.

In the trials here reported, special pullorin 1 detected 11.5 per cent more of the infected hens than did the agglutination test, and special pullorin 2 detected 13.1 per cent more.

The poultry industry stands in need of a diagnostic agent that will detect a high percentage of the infected birds and at the same time cause few of the non-infected to react. The work herein reported is a statement of progress only. The claim is not made that either of these pullorins has given entirely satisfactory results.

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Dr. Cullen to Head Drug Control

Dr. Frederick J. Cullen, medical officer in the U. S. Department of Agriculture, has been selected to head the drug-control work of the Food, Drug and Insecticide Administration, to fill the vacancy caused by the resignation of Dr. J. J. Durrett, who resigns to become State Health Officer of Alabama. Dr. Cullen joined the Department of Agriculture last year, transferring from the U. S. Public Health Service, Seattle, Washington, after twelve years' experience in the general practice of medicine and three years with the U. S. Army Medical Corps, including service on the Mexican border and in the World War. He will now have charge of the investigation and regulation of drugs, pharmaceuticals and medicines in the enforcement of the Federal Food and Drug Act.

DISPHARYNX SPIRALIS AND CYRNEA COLINI INFESTATION IN QUAIL, AND CAPILLARIA ANNULATA INFESTATION IN THE COMMON FOWL

By F. R. Beaudette *and* C. B. Hudson

New Jersey Agricultural Experiment Station, New Brunswick, New Jersey

On April 19, 1929, two dead quail were presented for examination by the Game Conservation Institute of Clinton, Hunterdon County, New Jersey. Again on the 22nd, two more specimens were received from the same source.

Practically all of the birds showed evidence of the so called "quail disease" which Morse,[1] in 1907, attributed to *B. coli* infection. In 1921, however, Gallagher met with a similar disease which he associated with coccidia. Although there was a slight coccidial infestation in some of the birds examined by us, it was evident that this parasite is in no way related to "quail disease."

One of the specimens in the first lot of quail presented showed a number of parasites in the proventriculus. The other specimen showed a different species of parasite in this organ. Of the two specimens in the second lot, one was free of nematodes, while the other was infested with both species. The smaller of the two species, of which there were 17 in one bird, was taken to be *Dispharynx spiralis*, a diagnosis which was later confirmed by Dr. Eloise B. Cram, of the Zoological Division, B. A. I., U. S. D. A. The other species was diagnosed by Dr. Cram as *Cyrnea colini*.

Apparently, this is the first time that *Dispharynx spiralis* has been taken from the quail. The finding of *Cyrnea colini* is of interest for the reason that, while it is common in quail of the southeastern states, it has not been found, according to Cram,[2]

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quail examined by her from Tennessee, Maryland, Pennsylvania and Massachusetts. However, Canavan, according to Cram,[3] has reported *Cyrnea colini* from a Texas bobwhite of the Philadelphia Zoological Garden. The bird had been brought from Texas only 18 days previous to its death so that the infestation was probably contracted in Texas. The history in our case revealed the fact that the quail had been reared in 1928, from stock trapped in Mississippi. Consequently, the parasites mentioned were undoubtedly brought in with the parent stock, and have since become established on the premises.

Cram[4] has already reported the occurrence of *D. spiralis* among carrier pigeons of the Signal Corps of the United States Army, at Fort Sam Houston, Texas, and also from the ruffed grouse and turkey for the first time. The same parasite, according to her, is also found in chickens, guinea fowls and pheasants.

The fowl in which *Capillaria annulata* was found was received on December 13, 1928, from Dr. S. Shapera, of Mamaroneck, New York. The diagnosis was confirmed by Dr. Cram. According to Dr. Shapera there had been about 30 deaths in a flock of 120 birds; affected birds were said to stand with arched necks. An examination of the specimen, which was in fair flesh, revealed a total of five nematodes in the upper part of the upper esophagus. There were no parasites in the crop, although the most pendulous portion of this organ showed thickening and sloughing. The kidneys showed evidence of nephritis, the surface of the organ being marked with white lines. The parasites in the esophagus sewed themselves in the mucosa and followed a tortuous course in the fashion of a coil. The bird also showed a few gizzard worms.

Capillaria annulata was first reported in this country by Cram,[5] in 1926. This infestation, which was found in turkeys in Maryland, constitutes the first report of the occurrence of this parasite in turkeys. It has also been identified by Cram[4] in ruffed grouse from Michigan and in chickens from Maryland. Infestations in chickens also have been reported in Georgia, Mississippi and Louisiana. A study of the pathological changes brought about by this parasite in turkeys has been made by Hung.[6] The parasite was first described in Europe as affecting chickens and later pheasants. It appears not to be of much consequence in the former species, however. In our own case, conditions other than parasitism may have been responsible for the losses.

More recently, Thomas[7] has reported the finding of *Capillaria annulata* in quail in Florida. Several losses were reported in a small flock kept in captivity.

We wish to express our greateful appreciation to Dr. Cram for identifying the parasites which form the subject of this note.

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AN OUTBREAK OF BRUCELLA DISEASE IN THE FOWL

By M. W. EMMEL, *East Lansing, Mich.*

Michigan Agricultural Experiment Station

Twelve birds intended for experimental purposes were purchased from an owner early in December. Before putting them on experiment, however, the agglutination test for the organisms of the genus Brucella was applied. This was necessary, as the birds were to be exposed to organisms of this genus. Three of the birds reacted to the test in dilutions of 1 to 25, 1 to 50, and 1 to 100. Blood samples were than collected from the ninety birds which made up the remainder of the flock. The result was that 16.5 per cent reacted to the agglutination test in dilutions varying from 1 to 25 to 1 to 100. Six of the strongest reactors were secured for further study. All showed macroscopic and microscopic lesions of the disease which have been previously reported.[1] *Brucella abortus* (Bang) was isolated from the spleen of one bird and from the kidney of another. The agglutination titre of both of these birds' blood was 1 to 50. As the organism has been found in the kidney upon several occasions it was thought that this might be one means by which the causative organism might gain access to the excreta. Necrosis of the tubular epithelium is generally present in this organ during the course of the disease.

A sample of feces was collected from each of the six birds studied. It was emulsified in 5 cc of physiological salt solution. This was then filtered through sterile filter paper and 2 cc of each

sample was injected subcutaneously into a guinea pig. The guinea pigs were kept under observation for six weeks and remained negative to the agglutination test.

The above birds were a portion of a commercial flock and even though a complete history was available, no decision could be made as to the probable source of infection. Very few deaths have occurred among these birds, but many are in poor physical condition and show symptoms of the disease. Egg-production has been greatly curtailed. The above report stresses the fact that birds should be tested for Brucella disease before going on any experiment and that many actual sources of Brucella infection are still unknown.

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AN INTESTINAL DIVERTICULUM IN THE FOWL

By M. W. EMMEL, *East Lansing, Mich.*

Michigan Agricultural Experiment Station

A White Leghorn was sent to the laboratory with the history of having died suddenly and of having shown no clinical symptoms before death. The abdomen was distended much like that of a

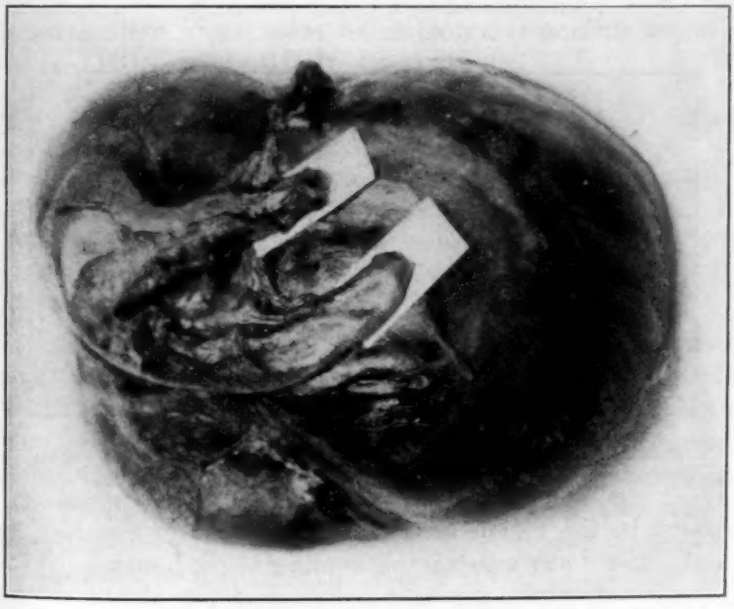

FIG. 1. Diverticulum in intestine of fowl.

hen with retained eggs or egg-yolks in the abdominal cavity. Postmortem examination revealed a diverticulum off the middle portion of the intestinal tract. The sac measured 6½ inches in length, 4½ inches in width and 3 inches in depth. Peritoneum covered the entire surface except a portion, a little larger than a peach, at the point of origin of the diverticulum. This portion bulged slightly, due to a slight rupture in the peritoneum. The diverticulum contained a ball of feces 1½ inches in diameter, an ounce of fluid and the remainder was filled with air. This condition was considered interesting as it is the first time it has ever been observed in this laboratory in the autopsy of a very large number of fowls.

UNUSUAL SPONTANEOUS FRACTURES IN PIGS

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In a herd of 109 pigs, 10 to 13 weeks of age, nine developed symptoms during a period of a week or ten days. The symptoms consisted of a disinclination to move about, apparently because of a weakness or soreness of the hind parts. Some of the affected pigs touched one hind foot lightly to the ground when walking. A rather striking symptom in all cases was a well-marked depression in the region immediately in front of the hip-joint. There was not any recognizable swelling of the joints.

FIG. 1. Spontaneously fractured ilium of a 12-weeks-old pig. The distortion was artificially increased in order to show clearly the location of the fracture.

The history of the pigs revealed the fact that they had "done especially well," that is, they had grown rapidly. They had been

kept largely in dry lot and had been fed a ration consisting of a mixture of hulled oats, ground yellow corn, and soy-bean meal. In addition to the grain mixture, the pigs had access to a complex mineral mixture containing nine ingredients. All of the pigs were known to have eaten freely of the grain mixture, but it was questionable if they ate much of the mineral mixture.

Autopsy: Two of the affected pigs were autopsied. The bones, particularly the ribs, were abnormally pliable and fragile. In each case there were conspicuous suggillations above and immediately in front of the hip-joint, and the ilium was fractured. The fracture occurred just above the acetabulum, at the junction of the epiphysis with the diaphysis of the ilium.

Discussion: In this case the abnormal bone fragility was evidently due to insufficient mineral intake. It is generally recognized that when soy beans are the chief source of protein in a ration for swine, it is necessary to supply additional minerals in order to obtain satisfactory results. The high palatability of the grain mixture in this case caused the pigs to eat large quantities of it while neglecting to eat the mineral mixture. The consequent rapid growth on a deficient mineral intake resulted in spontaneous fractures at a rather early age.

INFECTIOUS ENTERO-HEPATITIS IN THE PEA FOWL

By E. M. Dickinson, *Corvallis, Oregon*

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Oregon Agriculture Experiment Station

On October 21, 1929, two dead pea fowls (*Pavo cristata*), a few months old, were brought to this laboratory for diagnosis. The following history was obtained.

A year ago the owner had purchased three pea hens and a cock bird while on a trip to Chicago. He had the birds shipped to his ranch, which is chiefly a horse ranch, within a few miles of Corvallis. All the birds lived and were doing well. In the late spring of 1929, the owner purchased 250 turkeys because of the low price asked for them. Up to this time he had kept no turkeys on the place. The pea fowls were allowed to range over the entire ranch and no attempt was made to confine them. They were often noted in the lot in which the owner attempted to confine the turkeys.

In the spring of 1929, the pea fowls mated and were successful in raising seven young birds, which were also allowed free range as soon as they were able to take care of themselves.

The first sign of trouble came when, in the early fall, the old cock bird took sick, was droopy a few days and died. This bird was not examined and the owner gave no further thought to the trouble. A few weeks later two young pea fowls showed similiar symptoms and in a few days died. At this the owner became alarmed and the dead birds were brought to the laboratory for an examination.

The autopsy revealed typical circular areas of inflammation and necrosis in the liver, the areas being slightly concave. The ceca were enlarged and filled with the typical cheesy necrotic mass. Showing through to the serous surface of the ceca were more or less circular areas of inflammation that were producing some peritonitis and adhesions. What were grossly considered to be the common cecal worms were observed in the cecal content. The worms were not identified but in all probability were the cecal worms so commonly found in chickens and turkeys.

With the combined history and typical lesions the case was diagnosed as infectious entero-hepatitis (blackhead).

VIBRIONIC ABORTION IN SHEEP

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Sporadic outbreaks of abortion in sheep have been reported occasionally in Illinois for many years. The character of these losses has at times suggested the possibility of the existence of a specific infectious type of abortion in these animals, but owing to the practice of fattening and early shipment of aborters, little opportunity has been provided to study carefully the cause or causes of sheep abortions occurring in Illinois feed-lots. Farmers have been prone to attribute abortions to undernourishment, rough handling, or to different feeds of questionable quality in the rations. Proof of these different conjectures, however, has not been presented. On the other hand, evidence of the infectious character of abortion in sheep has been presented by Welch and Marsh,[1] of Montana, as well as by Carpenter,[2] of New York.

Received for publication, January 13, 1930.

These investigators, in studying widely separated outbreaks of sheep abortion, discovered a vibrio-like organism which had apparently been recognized in outbreaks of sheep abortion in England by M'Fadyean and Stockman,[3] in 1913, and in 1919 by Stockman,[4] working independently.

The existence of an infectious type of this malady in Montana and New York sheep, together with occasional abortions in sheep in Illinois, attracted our attention. The fact that many western sheep are fed each year in the Corn Belt further emphasizes the possibility of an infectious type of the disease occurring in Illinois. Until this year (1929) definite evidence of the existence of vibrio abortion in Illinois was not obtained, and while our observations in support of this contention are largely confined to one aborting flock of sheep purchased from a middle western market and shipped to an Illinois farm for fattening, the evidence is quite suggestive. Sporadic cases of abortion started in this flock in December, 1928, and came to our attention in March, 1929. One aborted lamb, upon bacteriological examination, yielded pure cultures of vibrio-like organisms. The results of this examination and subsequent observations made on ten ewes from the flock are reported, with the view of encouraging more extended observations in outbreaks of bovine abortion in the Corn Belt.

History of Outbreak

During the early part of March, 1929, Dr. W. Lester Hollister, of Avon, Illinois, submitted for examination an aborted, mature lamb. Autopsy revealed a marked congestion of the subcutaneous tissues, with an excess of pericardial fluid, slightly tinged with blood. No other gross lesions were found. The flock consisted of 241 ewes which had been purchased on the open market at Omaha, Nebraska, in October, 1928. Following purchase, the animals were shipped to the owner's farm in Fulton County, Illinois. The drainage on the farm prevented any surface water, while the conditions under which the animals were kept were sanitary. Seventy ewes aborted between December 1, 1928, and March 1, 1929 (fig. 1). On the same farm, 50 ewes of another shipment remained healthy and lambed normally. Wholesome alfalfa hay, corn fodder, and oats constituted the ration.

Bacteriologic Findings

The heart-blood and liver of the lamb submitted for autopsy were cultured on 5 per cent horse-blood agar slants. The cotton

plugs in the tubes were sealed with paraffin. After the heart-blood cultures had incubated for 72 hours at 37° C., a scant, gray, moist growth was observed on the surface of the medium. The liver, spleen and kidney cultures remained sterile. Upon staining the heart-blood cultures, a Gram-negative vibrio-like organism in pure culture was found (fig. 2). Morphologically the organism was a slender, spiral, bent or wavy rod of varying length. An occasional form extended across the field. Subsequent transfers grew on blood-agar media and the long forms were replaced by shorter, single, vibrio-like rods. On plain agar transplants it failed to grow; likewise the vibrio in bouillon cultures failed to develop. A composite sample of the heart-blood, liver, spleen and kidney were injected subcutaneously into two guinea pigs. One month after the guinea pigs were inoculated with the composite tissue specimen from the lamb, they appeared normal, and when examined at autopsy no gross pathologic lesions of Bang abortion infection were found. Blood collected from the guinea pigs at autopsy proved negative for Brucella agglutinins. Subcutaneous injection of the vibrio into pregnant rabbits and exposure of a pregnant sow, failed to induce abortion.

FIG. 1. Ewes from the aborting flock, purchased with the thought that some of them might abort under conditions that would permit careful observations. Aside from the loss of three ewes incident to trucking, they gave birth to normal lambs.

EWES PURCHASED FOR OBSERVATION

The presence of the vibrio in the heart-blood of the aborted lamb prompted the purchase of ten pregnant ewes from the aborting flock for observation. These animals were trucked approximately 150 miles from the farm in Fulton County to the Illinois Agricultural Experiment Station, where they were fed a

ration of alfalfa hay and equal parts of corn and oats. During the first ten days of the observation period, three of the ewes died. One ewe, before death, gave birth to two live lambs. The second fatally affected ewe, assisted by the clinician, also gave birth to two live lambs. Both ewes and lambs died two or three days later. A third ewe delivered two dead lambs. This ewe was found in a comatose condition, 72 hours later, at which time she was sacrificed for autopsy. The uterus was the only organ found to show gross pathologic changes. The uterine contents consisted of a sanious, greenish exudate. The mucosa was edematous, necrotic, and greenish in appearance. The histopathologic examination of the cotyledons showed a marked necrosis of the epithelium with extensive congestion and hemorrhage in the subepithelial tissues. Vibrio-like organisms were not found in the uterine mucosa or submucosa.

Examination of Lambs

The lambs that were born dead or died following birth were autopsied. Cultures of the heart-blood were made on blood-agar serum. Direct smears from the heart-blood and internal organs were also examined microscopically. A composite of the

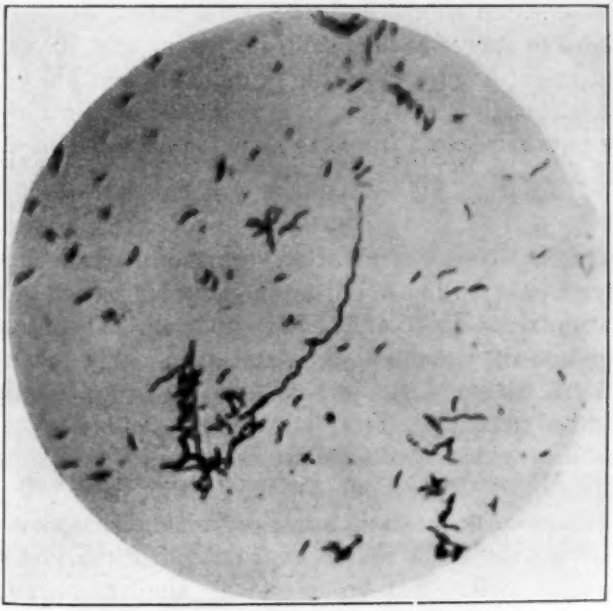

Fig. 2. Smears of blood-agar culture of vibrio isolated from heart-blood of sheep. The long forms diminished in number with cultivation on artificial media.

heart-blood, liver and spleen was injected subcutaneously into guinea pigs. The results of culturing and inoculating the materials from the six lambs failed to reveal the presence of the vibrio-like organism. In direct smears, however, occasional vibrio-like forms were seen. The heart-blood of three ewes that died was cultured on blood-agar plates and smears were examined from the walls of the uterus and vagina. One ewe showed a few vibrio forms in the vaginal exudate. The remaining seven ewes gave birth to eleven normal lambs. Two of these lambs died shortly after birth. Cultures from the heart-blood were negative to vibrio-like organisms.

Inoculated pregnant guinea pigs examined at autopsy showed no gross lesions of Bang abortion infection. Brucella agglutinins were not present in the blood of any of the ewe fatalities or guinea pigs inoculated with the materials obtained from the lambs.

Specificity of Agglutinins

Blood samples of the remaining seven normally lambing ewes were tested by the agglutination method for infectious abortion and for the vibrio organism in dilutions of 1:20, 1:50 and 1:100. One of the ewes gave a positive reaction to the vibrio antigen. All were negative to Brucella agglutinins. Repeated injections of the unattenuated vibrio culture into a rabbit caused specific agglutinins to appear in the blood, suggesting that the agglutination test might be of some value in detecting naturally infected animals, although agglutinins were demonstrated in only one of the few ewes purchased from the aborting flock. This ewe gave birth to two normal lambs.

Summary

A sporadic outbreak of abortion occurred in one flock of sheep in Fulton County, Illinois, during the lambing season of 1929, in which approximately 70 of 241 ewes aborted. These ewes were purchased on the Omaha market, and presumably originated on the western range. Fifty ewes of another group on the same farm lambed normally. From one aborted lamb fetus, a vibrio-like organism was isolated from the heart-blood, which culturally and morphologically resembled the vibrio described in two different outbreaks of abortion in ewes in the United States. As far as known, this is the first evidence of vibrio abortion in sheep in the Corn Belt. A morphologically similar microorganism associated with abortion in ewes was first reported in England in 1913.

Subcutaneous injections of the vibrio isolated by the writers did not produce abortion in pregnant rabbits or guinea pigs or produce gross lesions in these animals. Abortion was not produced by the vibrio when fed to a pregnant sow. Specific agglutinins were produced in a rabbit by repeated inoculations of the unattenuated vibrio culture. One of ten ewes from the aborting flock agglutinated the vibrio antigen in a dilution of 1:50. Three of ten pregnant ewes selected from the aborting flock, after being trucked to the Illinois Agricultural Experiment Station, succumbed after lambing. The lambs were dead at birth or died shortly after. Vibrios were not demonstrated culturally at autopsy in these lambs or in the ewes at autopsy.

(N. B. Under date of March 7, 1930, Dr. Graham reported that vibrionic abortion had again made its appearance on the same farm and the vibrio-like organism described by Marsh and his co-workers had again been isolated from an aborted fetus.—EDITOR.)

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Meat-Trade Code Violated

An important provision of a code of meat-trade practices, adopted last fall by the meat industry and approved by the Secretary of Agriculture, is being violated, according to information received by officials of the U. S. Department of Agriculture. The portion of the code involved is that of "engaging live stock at any public market, prior to the opening of the market, or buying live stock at any public market without divulging the purchase price at the time sale is effected." These procedures are declared to be unfair practices.

Referring to the approval of the code by the Secretary of Agriculture, in November, 1929, Dr. J. R. Mohler, chief of the Bureau of Animal Industry, states:

> The Secretary in his statement urged strict compliance with the code. The Department feels that the matter is of sufficient moment to warrant a close scrutiny by all packers who are party to the code and interested in its enforcement, so that, if any departure from the letter and spirit of the rule is found, prompt steps may be taken to bring about a correction of the condition.

According to the Department's information, the violators of the rule have been agents buying on order for packers, and also regularly employed buyers for the packers.

DIE MELKERKNOTEN UND IHRE AETIOLOGIE (Milker's Nodules and Their Causation). W. Schultze, O. Seifried and J. Schaaf. Zeit. f. Infekt. d. Haust., xxxi (1927), pp. 295-313.

UEBER MELKERKNOTEN MIT TOXISCHEM EXANTHEM (Milker's Nodules Complicated with Toxic Exanthem). W. Schultze and F. V. Grundherr. Arch. f. Dermat. & Syph., clviii (1929), pp. 1-15.

In the former experimental inquiry, the authors have proven that "milker's nodules" are to be considered a true vaccinia infection and that there exists a rather close relationship between variola of animals and variola of man. They showed that, in all probability, the several forms of pox originated from one preexisting pox virus. The latter inquiry is based on the study of seven cases in which the clinical picture differed from the lesions usually seen. The authors conclude that this skin affection is the result of a certain irritation (possibly a previous abrasion) by which the cow-pox virus is absorbed into the circulation and conveyed by the blood or lymph-stream.

Since the dissemination occurs from the seventh to the twelfth day following the infection, at which time immunity usually takes place, the authors infer that possibly the skin has not yet become immune, though the propagation of the contagion is arrested and the contagion itself undergoes decomposition, while the toxins produced cause the symptoms under discussion. These include the occurrence of nodules on the hand and lower arm, followed, 5 to 17 days later, by an acute exanthem having the character of papulo-urticarial lesions, accompanied by severe edema. The size of the papules is from millet-seed to the size of a small coin. Occasionally, the papules show a central pit. Recovery takes place as follows: The firm nodules grow flatter and broader, while the epithelium thickens and hardens so that the dermatitis finally resembles flat "verrucae vulgares." In the history of these

cases, the mentioning of a previous occurrence of an udder disease among cows and its spread to man seems characteristic. In two cases the diagnosis of this cattle disease has been verified as cow-pox.

F. V.

DAS KRANKHEITSBILD DER GEFLUEGELTUBERKULOSE DER HAUT BEIM MENSCHEN UND BEIM TIER (Nosology of Avain Skin-Tuberculosis in Man and Animals). E. Urbach. Arch. f. Dermat. & Syph., clvii (1929), pp. 360-381.

Four different forms of avian skin-tuberculosis in man are described: (1) The aphthous or septicemic form (one case), complicated with affections of the joints and bones. The tubercle bacilli found had been carefully typed and found to be of avian origin and of outspoken dermotropic tendencies. (2) The sarcoid or hematogenic form (two cases), resembling the affection known as Darrier-Roussy sarcoid. Typing was not resorted to, but the striking reaction to avian tuberculin, as compared with the rather weak reaction from human tuberculin, seems to justify the grouping of this dermatitis as of avian origin. (3) The gumma form (discussion of one case observed by Lipschuetz in 1914). The typing demonstrated avian origin. These three forms are considered to be of hematogenous origin. (4) The local ulcerous form is considered a cutaneous, exogenous infection. (Two cases in the literature are discussed.) In both cases, the diagnosis is based on the conspicuous reaction to avian tuberculin and the cultivation of avian tubercle bacilli.

The occurrence of skin-tuberculosis in poultry and of an experimental avian skin-tuberculosis in an ape is also considered. Then follow chapters on the bacteriology and the behavior of the avian tubercle bacillus in experiment animals and its distribution among other animals. Raebiger's sanitary measures for the control of avian tuberculosis are outlined. The author concludes that analogous to the various types of skin-tuberculosis due to the human strain there will also be found numerous clinical variations of the skin-tuberculosis due to the avian strain. The diagnosis has to be proven: (1) By a strongly positive allergic reaction to avian tuberculin (intradermic) and a negative or weakly positive reaction to human tuberculin. In cases of mixed infection, the patient will react to both types of tuberculin, although stronger to avian than to human. (2) Through cultivation (smeary, slimy growth on glycerin agar and crumbly growth on the bottom

of glycerin-bouillon). (3) Through animal experimentation (chicken will die from avian tuberculosis but not from bovine or human type).

The clinical picture of avian skin-tuberculosis resembles somewhat human skin-tuberculosis, but, aside from the septic complication, it cannot be readily identified with any of the known forms. A number of cases may be characterized by the absence of tubercle bacilli in the blood, urine and skin, and even by the absence of tubercular structure; nevertheless, avian tubercle bacilli can be grown from the lesions by the Loewenstein-Sumiyoshi sulfuric acid method. It is considered that, in the hematogenic cases, the infection is caused by the eating of eggs of tuberculous chickens, since Koch and Rabinowitch, as well as Loewenstein, have shown that eggs infected with tubercle bacilli cannot be sterilized in all cases by hard boiling, much less so by soft boiling.

F. V.

Sur un cas de Lupus tuberculeux dû au Bacille aviaire (Fowl Tuberculosis in Man). S. Nicolau and M. Blumental. Compt. Rend. Soc. Biol., (1929), p. 967. Abst. in Intern. Rev. Poultry Sci., II (1929), 3, p. 39.

In a man suffering from lupus an avian tuberculosis bacillus was found. The material was treated according to the Loewenstein-Sumiyoshi method, as supplemented by Hohn. Success attended cultivation on the feeding basis of Lubenau. Later cultures were obtained on the feeding basis of Petroff and Petragnani. Intravenous injection of the bacilli was fatal to hens after 20 to 50 days, without macroscopic tubercles. Macroscopic tuberculosis was caused by feeding. After 25 days rabbits died from intravenous injections, without visible tubercles (Yersin type). After intraperitoneal injection guinea pigs suffered from typical tuberculosis of liver and spleen.

F. V.

Über das Vorkommen von Tuberkelbazillen in Eiern tuberkulöser Hühner (Occurrence of Tubercle Bacteria in Eggs of Tuberculous Chickens). Abd El Magid Wahbi. Inaugural Dissertation, Vet. Hyg. Inst., Univ. of Leipzig, (1929), pp. 54.

A concise survey of 66 references in the literature is given. The incidence of tuberculosis among fowl and of the avian type

among mammals (including man) is discussed. The author found agreement that the hatchability of artificially infected eggs is rather poor but that such eggs may hatch and that the resulting baby chicks are short-lived and affected with tuberculosis. The interpretation of his results from the artificially infected eggs confirms the statement of Koch and Rabinowitch that avian tubercle bacteria have a very deleterious effect upon the chick embryo, and the statement of Fitch and Lubbehusen that the number of bacteria is greatly increased during incubation of the eggs. Concerning the presence of tubercle bacilli in eggs from naturally tuberculous chickens, quite divergent opinions were found. His own investigation consisted of the examination of 81 eggs, the major part of which came from positively reacting hens and a smaller number from a hen protectively treated with "antiphymatol" but exposed to the reactors.

Homogenization of yolk and albumen as an aid in centrifugation was most successfully effected by diluting the egg mixture with an equal amount of either 2 per cent antiformin solution or 0.3 per cent solution of sodium hydroxid. Check experiments proved that the viability and virulence of the bacteria are not disturbed by mixture with these materials. The eggs were tested microscopically, culturally and by animal experiment. Of the 81 eggs, 5 (6.2 per cent) were found to harbor acid-fast bacteria. In 4 of these, the acid-fast bacteria were found microscopically only, but could not be proven to be of tuberculous origin by cultivation. The other egg (1.2 per cent) proved positive in the cultural and animal experiment, although the microscopical examination of the egg-centrifugate failed to demonstrate tubercle bacteria.

F. V.

KAELVNINGSFEBER MED KRAMPE OG DENS BEHANDLING (Milk Fever with Spasms and Its Treatment). B. Voss. Medlemsblad for Den Danske Dyrlaegeforening, xii (1929), pp. 427-438.

In *Maanedsskrift for Dyrlaeger*, vol. 39, 1927, the author recommended the intravenous injection of chloral hydrate in milk fever with spasms and reported 7 cases, all of which were cured. From his own experience and from reports made by colleagues, the author now has the results from this treatment in 48 cases of milk fever with spasms and in 5 cases of acute meningitis (without milk fever). Of these 53 cases, 49 were cured, that is, about 92

per cent. Previously the recovery percentage was from 40 to 45. The curative effect of this treatment is probably due to the antispasmodic and blood pressure-lowering action of chloral hydrate.

The spasms usually set in 6 to 24 hours after the onset of milk fever, in the muscles of the head and the neck, sometimes in all the muscles of the body.

Treatment: First, heart stimulants, such as camphor ether (1 + 4), 40-60 cc; or camphorated oil (1 + 4), 50 cc, subcutaneously. Then injection into the jugular vein (centrally, if possible) of a fresh solution of chloral hydrate (60 gm. chloral hydrate and 5 gm. sodium chlorid to 1 liter of boiled water). The injection is kept up till the animal is in deep narcosis (loud snoring), which should last at least three hours. For a cow of medium size 50 grams of chloral is a suitable dose, as a rule. When the injection is completed, an ice-bag is placed on the head of the cow and a light air infusion is given into the udder.

The treatment is tolerated well, and practically all the treated animals soon return to high milk-production.

Convicted of Obstructing Cattle-Testing

Four cattle-owners of Butler County, Ohio, were found guilty and convicted recently in the Federal Court at Dayton, Ohio, for conspiracy to assault and forcibly oppose employes of the U. S. Bureau of Animal Industry, who attempted to test herds of cattle for tuberculosis. The defendants, among others, had endeavored to hold up the area plan of tuberculin-testing in the county by force and violence, after an injunction issued by the local court had expired. The men carried a shotgun, a blacksnake whip, pitchforks, clubs and stones.

After most of the herds in the county had been tested, cattle-owners and breeders appealed to the local federal and state authorities to send veterinarians to test the remaining 52 herds, in order that the county might become classed as a modified-accredited area. The violence occurred on July 23, 1929, when Drs. Solon Gillen and Chas. S. Elliott endeavored to complete the test on one of the herds.

The case was tried before Judge Robert R. Nevin and the trial lasted three weeks. The four persons convicted face imprisonment in a federal penitentiary and fines up to $10,000. They have appealed to a higher court.

HANDBUCH DER GEFLÜGELKRANKHEITEN UND DER GEFLÜGELZUCHT. (Manual of Poultry Diseases and Poultry Husbandry.) Dr. T. van Heelsbergen, Bacteriologist, College of Veterinary Medicine, University of Utrecht, Holland. 608 pages with 350 illustrations. Ferdinand Enke, Stuttgart, 1929. Paper, 45 marks; cloth, 48 marks.

This book is by far the best of its kind yet published. Dr. van Heelsbergen, who has had a wide experience with infectious diseases of birds, has written the section dealing with this subject, which, owing to its great importance, has been allotted most space. However, with the exception of micropathology, no phase of poultry pathology or poultry husbandry has been neglected in this excellent book and the author has, very wisely, chosen some prominent collaborators who have written the sections dealing with the branches of poultry diseases and poultry husbandry in which they are especially experienced.

The following is a list of the sections with their respective authors: anatomy and physiology of the fowl and autopsy technic, Dr. H. A. Vermeulen; feeding, nutritional diseases and breeding, Dr. S. M. v. d. Plank; hygiene, Dr. B. J. C. teHennepe; infectious diseases, Dr. van Heelsbergen; diseases caused by protozoa and spirochetes, Dr. B. J. Krijgsman; parasitic diseases, Dr. E. A. R. F. Baudet; leukemia and tumors, Dr. H. J. M. Hoogland; organic diseases, vices, castration, narcosis and poisoning, Dr. H. Veenendaal. One may at least surmise from this list of subjects and names of authors that the subject of poultry pathology and poultry husbandry is well covered. All of the chapters are of such a high quality that it would be unfair to single out any one for special mention.

This book is very legible, the material is well arranged, the bibliography is fairly complete, the illustrations are not only numerous but excellent and the work of the publisher is of the very best. Research workers, teachers and practicing veterinari-

ans interested in poultry will profit by and welcome this manual on a subject which is becoming more and more important. In this instance, as in others, those of us who are fortunate in having had to learn German will derive immediate benefit from the excellent work of our Dutch and German colleagues. Others will have to wait. Just another argument in favor of the study of important foreign languages.

H. J. S.

THE PREVENTION OF HUMAN TUBERCULOSIS OF BOVINE ORIGIN. William G. Savage, B. Sc., M. D. (Lond.), D. P. H. 195 pp. Macmillan & Co., Ltd., London, 1929. Cloth, 10/6.

In this book the author has attempted to "re-investigate" the subject set forth in the title. He points out that in dealing with non-pulmonary tuberculosis of bovine origin there is too decided a tendency to bury the victims and treat the survivors, at great cost. Too little attention is being directed at methods of prevention. The book is divided into eight chapters, as follows: I. The Vehicles of Spread. II. The Amount of Human Tuberculosis of Bovine Origin. III. The Problems of Bovine Tuberculosis. IV. Methods Adopted for Reducing Bovine Tuberculosis and the Risks of Tuberculous Milk. V. Technical Problems in Relation to Bacteriological and Veterinary Control. VI. Immunity Problems and Bovine Tuberculosis. VII. Pasteurisation and Tuberculous Milk. VIII. The Reduction and Elimination of Human Tuberculosis of Bovine Origin.

Radio Dog Club

Every Thursday evening at 7:45 p. m., E. S. T., Dr. Glenn Adams and the Radio Dog Club meet over station WLW for a quarter-hour discussion of dogs. The program consists of talks on such subjects as care and feeding, kennels, buying and training a puppy, disposition, summer care, with every alternate week a question-and-answer program, during which Dr. Adams selects questions of general interest and answers them to the best of his ability. Dr. Adams is a physician who has made a hobby of dogs. From his knowledge of dogs and his own personal experience, he is said to be able to interpret the actions of dogs into human thoughts and acts that are understandable by children as well as adults, with the result that a better understanding of dogs is encouraged among the adio fans who listen in. The programs are sponsored by the Battle Creek Dog Food Company.

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CHANGES RELATIVE TO VETERINARY OFFICERS

Regular Army

Colonel Walter Fraser is relieved from duty at headquarters, First Corps Area, Boston, Mass., effective on or about April 20, 1930, and directed to report to The Surgeon General, Washington, D. C., for duty in his office.

Major William H. Houston is assigned to duty at Fort Sam Houston, Texas, upon completion of his present tour of duty in the Hawaiian Department.

Major Clell B. Perkins is relieved from duty at Fort Sam Houston, Texas, effective at such time as will enable him to proceed to San Francisco, Calif., and sail on the transport scheduled to leave that port about July 9, 1930, for duty in the Hawaiian Department.

Captain Clifford E. Pickering is relieved from his present duty at San Francisco General Depot, Fort Mason, Calif., effective on or about July 5, 1930, and directed to report to Fort Bliss, Texas, for duty.

Captain William H. Dean is relieved from his present assignment and duty at Fort Riley, Kans., and will report to the Commandant, The Cavalry School, Fort Riley, Kans., for duty as an instructor.

Captain Harry J. Juzek is relieved from further duty at the Army Veterinary School, Army Medical Center, Washington, D. C., effective on or about July 5, 1930, and assigned to duty at the Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa, for duty.

Captain Oness H. Dixon is relieved from further duty at the Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa, effective on or about August 1, 1930, and directed to report to the commandant, Army Veterinary School, Army Medical Center, for duty as a student.

Veterinary Reserve Corps

New acceptances

Rowe, Hansford Herndon	Captain	316 N. Henry St., Richmond, Va.
Jones, Carrel Lewis	Captain	266 E. First South, Provo, Utah.
Means, Truman Isaac	Captain	709 Gildersleeve St., Santa Fe, N. M.
Burgess, John Joseph	2nd Lt.	2550 Garfield Ave., So. Minneapolis, Minn.
Muxlow, Thomas Jerome	2nd Lt.	1102 Thurston St., Manhattan, Kans.

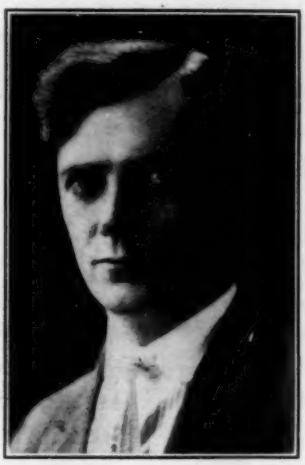
Promotions

Marcus, Carlton Parks	to Major	401 Magnolia Ave., Frederick, Md.
Montgomery, Rollo S.	to Major	36 N. 1st St., Highland Park, Ill.
McIlree, Jos. Rummel	to Capt.	Palmyra, Wisc.
Jackson, Gilbert Turner	to 1st Lt.	2218 Baronne St., New Orleans, La.
Reece. Dean Eric	to 1st Lt.	Rossville, Ill.

MISCELLANEOUS

Michigan Starts Abortion Project

The Michigan State Board of Agriculture recently authorized an abortion control project for the Wolverine State. Dr. B. J. Killham, who has served as state veterinarian of Michigan for the past eight and one-half years, has been appointed extension



DR. B. J. KILLHAM

specialist and assigned to the Department of Animal Pathology of Michigan State College, to direct this project. Dr. Killham's successful administration of the office of State Veterinarian, his wide acquaintance with the veterinarians and breeders of the State, and the confidence which they have in him especially recommend him for this position. His appointment became effective March 15.

The project is an educational one. An attempt will be made, through group meetings, to give to the owners of abortion-free herds the information necessary to keep their herds free from this disease, and to the owners of diseased herds, the information

necessary to free their herds of this disease. Further, an attempt will be made to teach, by actual demonstrations in infected herds, the method of cleaning up a herd by systematic testing and segregation. These demonstration herds will be so located as to be of the greatest educational value not only to the community but to the State as a whole. They will be selected only after careful consideration of all factors by the extension specialist, the county agricultural agent and the cooperating local veterinarian in charge of the herd.

It is realized that, if the greatest possible success is to be attained in any plan for the control of abortion disease, it is necessary to have the interest and cooperation of the practicing veterinarians in this project. Therefore, it is planned that the extension specialist will devote part of his time to instructing, cooperating with and directing the practicing veterinarians in this work.

For the present and immediate future, the individual herd and not the area will be the basis for starting a plan of control. In the infected herd, in the progress of cleaning up, many problems will arise requiring technical knowledge and action for solution. Each herd is an individual problem. Whether disposal of the reacting animals, partial segregation at the time of calving, or complete segregation should be done, will depend upon the size of the herd, the percentage of infection, the age, value and productive ability of the reacting animals, the facilities on the farm for separate stables, lots and pastures, and the efficiency of those in charge of the herd. A rational plan of procedure applicable to the particular herd can not be recommended until all the factors have been carefully considered by some one possessing good judgment and technical knowledge of the problem.

After a plan of operation in the herd has been started, unforeseen problems will arise requiring technical knowledge for solution. There can be little hope for the greatest success in controlling abortio nunless there is constantly available an adequate veterinary service for the solution of these problems. If there is a local practitioner in the community possessing adequate training and experience, or one who can be trained, and who has the confidence of the breeders, he can give his service more efficiently and economically than anybody else.

There are many phases of abortion control work that are of a regulatory nature. The supervision of the testing of herds, the accrediting of herds free of this disease, and the formulation

and execution of regulations pertaining to testing, segregation, movement and disposition of reacting animals are functions of the Department of Agriculture. Therefore, the extension specialist will at all times endeavor to cooperate with the State Department of Agriculture on this project.

E. T. H.

WOMEN'S AUXILIARY TO THE A. V. M. A.

Minutes of the Thirteenth Annual Meeting, Detroit, Mich., August, 15, 1929.

The thirteenth annual meeting of the Women's Auxiliary to the American Veterinary Medical Association was called to order by the President, Mrs. Peter Malcolm, of Des Moines, Iowa, at the Book Cadillac Hotel, Detroit, Mich., August 15, 1929.

Mrs. B. J. Killham, of East Lansing, Mich., offered a prayer asking that our lives be given more to His service. Mrs. A. S. Schlingman, chairman of the Ladies' Entertainment Committee, extended a very cordial welcome to every lady. Mrs. G. G. Graham, of Kansas City, Mo., made the response to the address of welcome and emphasized the fact that much pleasure is to be derived from attending the meetings of the Auxiliary.

Mrs. Malcolm, in her presidential address, emphasized three points especially. First, we should increase our membership in order to be able to help more young men through college. Second, we should join the General Federation of Women's Clubs. Third, we should organize women's auxiliaries in connection with the various state associations.

Following the President's address, Mrs. W. Horace Hoskins, of Philadelphia, Pa., was introduced as the "mother" of the organization, in view of the fact that she was the first president of the Auxiliary, which was organized in Kansas City, Mo., in August, 1917. Mrs. Hoskins expressed a heartfelt desire that the Auxiliary might meet with every possible success and she said that her absence from the meetings did not mean any lack of interest.

The reports of the Secretary and the Treasurer were presented and accepted as read. The report of the Secretary showed that there were 219 members on the roll and the report of the Treasurer indicated that the Auxiliary was in a splendid financial condition. The Loan Fund Secretary reported that two loans had been made

during the year and that all notes due the Auxiliary had been paid when due.

The report of Mrs. C. E. Cotton, of Minneapolis, Minn., as chairman of the Committee on Revision of the Constitution, was presented and action on same will be taken at the next meeting.

Mrs. J. D. Grossman, of Columbus, Ohio, was elected third vice-president and Mrs. J. C. Flynn, of Kansas City, Mo., was elected fourth vice-president.

There were 246 present at the delightful luncheon given by the local committee, but unfortunately many of the ladies did not stay for the meeting of the Auxiliary. The President thanked the local committee for the splendid entertainment that had been arranged for the ladies while in the city and she voiced the sentiment of every lady present. There being no further business, the meeting adjourned.

Mrs. H. Preston Hoskins, of Detroit, Mich., introduced a trio of musicians representing the Duo Art Piano Company, who gave a delightful musical entertainment. Everyone present enjoyed an hour of interesting and instructive music. There were approximately 400 ladies registered at the convention and 21 new members joined the Auxiliary during the meeting.

MRS. S. E. HERSHEY, *Secretary.*

EXECUTIVE BOARD ELECTIONS

Executive Board elections are now in progress in five Executive Board districts as follows:

District 5: Minnesota and Iowa.
District 7: Washington, Oregon, Idaho, Montana, Wyoming, North Dakota, South Dakota, Nebraska, Alaska, Hawaii and the Philippines.
District 8: Oklahoma, Texas, Kansas, Missouri, Arkansas and Louisiana.
District 9: Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut and New York.
District 10: Michigan and Ohio.

Ballots calling for nominations were dated February 26—six months prior to the opening date of the Los Angeles convention. Polls will close April 26, and ballots for the election proper will be mailed out as soon as possible after that date. It will be quite a little job to prepare five different lots of election ballots, after the nomination ballots have been canvassed, but this work will have precedence over other matters and we expect to have all ballots in the mail by April 30.

Quite a few letters have been received from members asking why they did not receive ballots. In every case investigation has

disclosed that these members had failed to pay their 1930 dues. The by-laws provide that no member may participate in an election unless he is in good standing and all dues paid. This rule is inflexible, consequently no ballots are mailed to members who are behind with their dues. The dues for 1930 were due and payable January 1.

Three Nevada Counties Complete Testing

Three counties in Nevada have completed tuberculosis-eradication work and became modified accredited areas on March 1. This means that another state is added to the list of those having areas where not more than 0.5 per cent of the cattle have tuberculosis, as shown by the tuberculin test. The new counties are Douglas, Lyon and Ormsby, which include 2,400 square miles. In this area approximately 36,000 cattle were tested and 190 reactors found. The work done in these three counties is of particular interest, owing to the fact that the cattle are largely of the range or semi-range type. Similar work has been under way in other western states. The three counties in Nevada are among the eleven new counties in eight states recognized by the U. S. Department of Agriculture, March 1, as modified accredited areas. The total number in the United States is now 907 counties, parts of three other counties, and 36 towns in Vermont.

Bears in Yellowstone Lake

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was held at the Academy of Medicine Bldg., 103rd St. and Fifth Ave., on Tuesday evening, January 7, 1930, at 8:30 p. m. Dr. R. J. Garbutt, President, called the meeting to order.

The presidential address of Dr. Garbutt covered the relationship of the veterinarians to the public, especially in the small-animal field. He believed that the saturation point had been reached, in so far as the large cities were concerned, for the small-animal practitioner. He urged the limiting of the number of students entering the veterinary colleges and that the course should be increased to five years. The veterinarian in practice said Dr. Garbutt, should be the major factor in determining the number of men needed in the field. In closing he thanked the members for the honor they had conferred upon him.

The speaker of the evening was Dr. Richards, veterinarian of the Jockey Club. His subject was "Influenza Pectoralis and Its Treatment with the Use of Neosalvarsan." The Doctor sketched the course of the disease and its treatment under the old methods He spoke especially of the sequelae of the disease on race-horses with its loss of form and poor stamina.

The treatment consists of 4½ grams of neosalvarsan in 100-150 cc of distilled water, heated to the body temperature, and injected intravenously. He urged the use of a hog cholera serum needle and to be sure of hitting the jugular before injection. The animal should be normal in 24-36 hours. No further treatment should be needed. Cases in advanced stages, cleaned up in 3 to 5 days. With no other treatment could you tell the owner that the animal would be well in 36 hours. No reaction to the treatment was noticed except when the jugular was missed in injecting, in which case, uneasiness and restlessness developed,

but no bad results followed. In conclusion Dr. Richards states that he believed neosalvarsan was specific for the treatment of influenza pectoralis.

Discussion: Dr. R. W. Gannett agreed with Dr. Richards and cited a number of cases which cleared up rapidly by the use of this drug. Dr. H. Ticehurst told of using anti-hemorrhagic-septicemia serum for congestion of the lungs, repeating in 48 hours. One young colt with pneumonia was cured with the use of this serum. Dr. Gannett also brought out the fact that neosalvarsan was used for the treatment of periodic ophthalmia. Its use in small animals has not been successful as yet according to Dr. H. J. Milks.

A very interesting and spirited discussion followed on the Laidlaw-Dunkin method of distemper immunization, in which Drs. Ticehurst, Crawford, Little, Rohrer, Chase, Garbutt and Gannett participated, each citing cases which proved or disproved of the efficacy of the vaccine. In general it was agreed that the dog should be thoroughly examined and have been in the owner's possession for at least 2 to 3 weeks before vaccination. It was also the concensus of opinion that the dogs coming into the hospital to stay should not be vaccinated but rather should be given serum to hold them while there. Dr. Little spoke of veterinarians making the vaccine themselves, stating that the procedure is quite simple and easy.

Case reports: Dr. Garbutt presented an x-ray picture of a head of a Boston Terrier with dislocation of the atlas. Two Bostons having collided headon with the result that this dog received a fracture of the atlas, dying shortly afterwards. Drs. Crawford and Ticehurst reported similar cases.

A letter was read from the Secretary of the Hudson Valley Veterinary Medical Association with regard to increasing the annual registration fee from $1.00 to $2.00, the money to be used for an investigator to look up complaints concerning illegal practitioners. On discussion Dr. Gannett stated that, as it is now, all money not so expended during the year reverts to the state.

Dr. Little moved that the money be allowed to accumulate from year to year and, if this were done, this society would be in favor of increasing the registration fee. Motion carried and the Secretary was instructed to inform the Hudson Valley Association of this action.

A letter was read from Dr. Charles E. Clayton, tendering his resignation. It was accepted with regrets and upon a written motion of Drs. MacKellar, Chase and H. R. Miller it was unanimously moved and carried that Dr. Clayton be elected to honorary membership in this society.

A rising vote of thanks was extended to Dr. Richards for his interesting and instructive paper.

No further business appearing the meeting adjourned.

JOHN E. CRAWFORD, *Secretary.*

CORNELL CONFERENCE FOR VETERINARIANS

The twenty-second conference for veterinarians was held at Cornell University, January 16-17, 1930. Dr. G. S. Hopkins presided during the first session. Dr. Pierre A. Fish, dean of the New York State Veterinary College at Cornell University, gave a brief survey of veterinary affairs. He said that one of the best things Dr. V. A. Moore ever did was to inaugurate the series of annual conferences. Increased registration in veterinary schools was stated to be promising and called an indicati[illegible] growing appreciation of the service veterinarians might re[illegible]der. Knowledge of feeding and breeding of live stock, accessory food substances or vitamins in relation to growth, fer[illegible]ity, and the activities of animal life was indicated as necessary to the growing practitioner.

The importance of the cow and poultry in the [illegible]eme of practice was emphasized. The statement that the value of poultry in the United States was greater than that of all the cattle and $300,000,000 more than the wheat crop was striking. The value of the poultry work carried on by the veterinary units at Farmingdale, L. I., and Cornell was complimented and the participation of practitioners in poultry practice and the founding of more poultry laboratories throughout the State was stressed. Such progress would allow the veterinary staff more time for research work, which was said to be the basis of our progress and the only way problems might be solved and the results utilized for curative and preventive purposes. The practitioners' course was cited as a means of growth.

Veterinary societies deserve the support of all veterinarians who have the best interest of the profession at heart. An important sentiment as expressed in this survey is quoted in the following paragraph:

The vital or living wealth that our government has invested in the bodies and health of its citizens is worth five times as much as that invested in mines, factories, farms, and other material goods. It is a tremendous investment and the veterinarian should do his bit in safeguarding it through an appreciation of his participation in public health work.

Dr. C. M. Carpenter, of the Albany Medical College, gave two papers. The first dealt with "*Brucella Abortus* in Swine," pointing out the incidence of the infection in swine and the infection of man from this source. The second paper was rather highly technical and had for its matter, "The Relation of Fever to Disease with Special Reference to Experimental Syphilis with Demonstration of Short Radio Waves." The paper served to emphasize the progress being made in the application of the newer phases of electrical physics in the study of disease.

Dr. V. A. Moore and Dr. D. W. Baker gave a joint paper, "Undulant Fever." This paper took up a discussion of the prevalance of the disease in New York State and the United States. It was said not to have become of major importance because cases were not very frequent and the infection was of fairly low virulence. The paper discussed the results of a survey, made in 1928-29, by the authors, of the raw milk sold in nine of the counties in central New York State. The results indicated that the area as a whole had about a 20 per cent infection of the raw retail milk with *B. abortus*. A much greater proportion of the milk in both cities and rural districts is now pasteurized, and it was rather difficult to obtain samples of raw milk in localities where raw milk was once sold entirely.

Mr. B. J. Errington, a senior at Cornell, has had considerable experience and success in raising foxes. He gave a paper on "The Care of Foxes," and illustrated it with a film obtained from the U. S. Department of Agriculture. Mr. Errington touched on most of the practical problems in fox-ranching and showed a wide knowledge of such problems as housing, feeding, breeding, mating, disease prevention and treatment, and pelting the animals with preparation for market. This was a very interesting and instructive feature of the morning program.

Dr. H. L. Gilman gave a paper, entitled, "The Elimination of *Bact. Abortus* in the Milk of Cows." As a basis for this paper, investigations were carried on to determine the relation between the agglutinin content of the milk and the presence of *B. abortus* in the milk, as determined by guinea pig inoculation. The milk from 174 quarters of 43 cows was used in the work. Of these,

66 showed no agglutinins; 13 showed agglutinins in dilution under 1-80 only; 93 showed agglutinins in dilutions of 1-80 and over. The organism was recovered in 50 (53.7 per cent) of the 93 quarters giving a milk-serum titre of 1-80 and over. The organism was not recovered when the milk titre was under 1-80, nor from an animal with a blood-serum titre under 1-320. The highest blood-serum titre in these animals was positive at 1-81, 920. The highest milk-serum titre was positive at 1-20, 480.

Dr. R. R. Birch gave the last paper of this session, "Bang Abortion Disease in Relation to Inter-Herd Transfer of Cattle." He covered the subject of inter-herd transfer of cattle in relation to Bang abortion disease. He emphasized the necessity for considering the status of the herd from which cattle come, and that of the herd which is to receive them, instead of centering all the attention on the reaction of the animals which are transferred. He stated that the control of the disease is not an area problem, but a herd problem, and showed the desirability of permitting transfer of chronic reactors into herds consisting altogether of reactors, as an aid in weeding the infection out of herds containing only a few reactors. He also declared that, as a general rule, breeding cattle should be accompanied with agglutination charts when sold, so that the purchaser could select according to the known prevalence of infection in his own herd. He was not in favor of preventing sale of all reactors, as this would compel owners of infected herds to purchase cattle which later would contract the infection in the reacting herd.

Dr. D. H. Udall presided during the afternoon session of the first day. Dr. D. W. Baker gave an instructive talk along the lines of precautions to be taken in shipping material for diagnosis. This was a comprehensive talk and contained a good bit of sound advice which was illustrated by numerous examples of the right and wrong way to ship material.

Dr. Howard Welch, of the University of Montana, and an alumnus of Cornell, gave the next paper, "Sheep Diseases of the Northwestern States." Dr. Welch discussed quite fully the symptoms, treatment, and prevention of the diseases of sheep of known etiology as well as the symptoms and treatment of some of the unknown etiology. The whole talk was a combined scientific-practical discussion interspersed with shafts of delightful humor. The paper was illustrated with slides which helped one to gain better insight into the problems of husbandry and disease besetting the sheep industry in the section in

which Dr. Welch so ably helps to protect the interests of the industry.

Dr. P. Olafson discussed "Ictero-Hematuria of Sheep." He gave a fine description of this disease which he feels has come to his attention from a flock in New York State. A very fine chart, giving the findings of other workers as to etiology, symptoms, pathological changes, etc., helped in a very good presentation and discussion of the disease. Dr. C. E. Hayden pointed out some conditions and some findings in regard to "The Constituents of the Blood of Animals as Evidence of Intestinal Contribution to the Cause of Diseases of Obscure Origin." Findings in the case of pre-parturient paresis, stiff lambs, ictero-hematuria and azoturia were presented as possible evidence that the intestinal tract might and does contribute to the etiology of these disturbances.

The paper, "Pyometra in Bitches," by Dr. H. C. Stephenson, was read as a part of the program of the morning session of the second day.

At the evening session of the first day, Dr. A. T. Kerr gave an address of welcome on the part of Cornell University. Prof. A. W. Browne gave his famous lecture on liquid air. To say that this lecture was interesting would be to state the obvious to any one who has ever heard Prof. Browne. It was one of the high spots of the conference. A smoker and get-together followed the lecture.

Dr. R. R. Birch presided over the morning session of the second day. F. G. Caslick gave an illustrated paper, "Gastro-Pleuro-Pericardiac Relations with Demonstration." Prof. E. S. Savage, of the College of Agriculture, has a study of protein feeding of dairy cows under way and he reported on the progress of that experiment. Different groups are being fed rations of 16, 20 and 24 per cent protein content. The experiment is incomplete, but to date it looks as though the group on the 20 per cent protein ration might be doing better in both milk and fat production. The completed program is certain to be of great value to the dairy industry.

Dr. T. H. Ferguson, president of the A. V. M. A., talked on cattle diseases. This talk was characteristic of Dr. Ferguson. His careful study and application in the practice of veterinary medicine and surgery have given him a fund of information which few men in the profession have attained. He drew upon that fund to the interest and instruction of every man and woman in the audience. Two women have recently been gradu-

ated from Cornell and both were in attendance at the conference.

Dr. J. W. Benner detailed his recent work on "Experiments on Immunizing Young Pigs against Hog Cholera." The paper of this session was by Dr. E. L. Brunett and it dealt with "Paratyphoid Infection of Pigeons." Alumni meetings were held while luncheon was being served.

Dr. W. A. Hagan presided over the afternoon session of the second day. Dr. D. H. Udall talked on mastitis and Dr. F. D. Holford gave a paper which discussed mastitis and its effect upon the milk industry. Dr. F. S. Jones, of the Rockefeller Institute, Princeton, N. J., led the discussion on the subject. Dr. Udall dealt with laboratory and clinical aspects of the disease. Dr. Holford emphasized the immense loss from it to the milk producers and Dr. Jones discussed it from both laboratory and clinical aspects.

Mr. H. J. Henry, Assistant Commissioner, Department of Farms and Markets, Albany, talked on the new plan of retesting fully accredited herds at state expense. He outlined the main features of the plan and stated that the details were yet to be worked out. He stated that New York State had around 75,000 herds of dairy cattle. He expected no opposition to the appropriation of funds with which to carry on the work.

Dr. H. J. Milks gave the final paper on the program of the afternoon. He described the clinical symptoms of the common diseases of the perineal region of small animals and made a number of helpful suggestions relative to the treatment of each disease.

Dean Fish presided over the annual banquet and initiated the program of the evening by striking up the familiar "Alma Mater" in honor of the visiting Cornellians. At the conclusion of a very satisfactory dinner, Dean Fish gave a short introductory talk in which he brought out the close relationship which has existed between the public health and veterinary profession. This relationship is recognized today as it never has been before and the veterinarian is held in higher esteem than he was in the early days of veterinary history. Jenner, Pasteur, Koch and Theobald Smith were referred to as men who had made fundamental discoveries in the fields of medicine and disease. Dr. V. A. Moore. also, might be cited for his fine and careful research work with the diseases of poultry. The speaker gave a brief review of the early difficulties encountered in the attempts to establish a more scientific veterinary education in the United States.

Prof. R. H. Wheeler, of the Extension Department of the College of Agriculture, spoke in place of Dr. C. E. Ladd, who was unable to attend on account of illness. Prof. Wheeler stated that the extension work in the State was purely educational and results to date had been very gratifying. He said that trained veterinarians are needed in many rural communities and closed his address by saying that the various agricultural organizations were anxious to cooperate with the veterinarians in trying to improve the lot of the New York farmers.

Dr. J. N. Frost gave a paper on "Coccidiosis of Cattle." The disease has been given very little study as it occurs in the larger domestic animals. It is quite frequently seen in young calves as well as in adult cattle. Fecal examination for the presence of oocytes is the only means of making a positive diagnosis. Many cases are fatal unless the treatment is prompt. Dr. Frost and Dr. Julius Maurer have found the intravenous injection of chinosol, a common remedy in Switzerland, an effective agent in the treatment of several cases of the disease.

President Ferguson set forth the important and invaluable work which the A. V. M. A. is doing to promote the welfare of all veterinarians and to safeguard the interests and ideals of the profession. He stressed the desirability of every veterinarian belonging to the A. V. M. A. and thus to receive the JOURNAL of the A. V. M. A. He stated that the information so gained would soon repay each member for his dues to the Association. He expressed pleasure at being able to attend one of the best conferences he had been privileged to attend.

The twenty-second annual conference was said by many to have been the best of them all. Certainly Dean Fish has reason to appreciate the great success coming to the first conference in his administration. The high standards set by Dean Moore have carried on and it is the hope and faith of the staff at Cornell University that each succeeding conference will continue to be better that the last.

C. E. HAYDEN,
JESSE SAMPSON, *Reporters.*

TENNESSEE VETERINARY MEDICAL ASSOCIATION

The twenty-second annual meeting of the Association was held in the Agricultural Building of the University of Tennessee, Knoxville, January 14-15, 1930. This meeting was very well attended by veterinarians from all parts of Tennessee and an

interesting program was presented. The meetings were presided over by Dr. J. W. Scheibler, President, Dr. R. L. Whitaker, Vice-President, and Dr. A. C. Topmiller, Secretary.

Dr. R. E. Baker, Morristown, presented an excellent paper on "Diseases of the Udder Frequently Met with in Practice." He described the various types of udder disease and outlined treatment. This subject is of great importance to Tennessee veterinarians and aroused considerable discussion on the part of most of those present. Commissioner of Agriculture, W. J. Fitts, M. D., who is a well-known judge of hogs and a breeder of Duroc-Jerseys, attended the meeting and took part in the discussion. He called attention to the prevalence of mastitis in sows in the hot weather of the fall and said he believed many cases are associated with uterine infection. He asked that veterinarians try douching the uterus in such cases.

Dr. L. D. Nowell, Humboldt, discussed the subject, "Infectious Disease Problems in West Tennessee," calling attention particularly to hemorrhagic septicemia in cattle and sheep. This disease with blackleg, anthrax and hog cholera, present the greatest disease problems. Dr. S. A. King presented a paper on "The Lesions Found in Meat Inspection Work in Tennessee." He stated that the most lesions were of tuberculosis and that the most of these were in animals imported into Tennessee. He also said that two million dollars worth of hogs were being shipped annually into Tennessee for slaughter, and which, he thought, ought to be supplied by Tennessee hog-producers.

Dr. E. L. Stubbs, of the University of Pennsylvania Veterinary School, discussed "Poultry Diseases" and this was supplemented by lantern-slides of the more common ones. Dr. M. Jacob, of the University of Tennessee, presented a very practical paper on "The Problem of Bang Abortion Disease in Tennessee." He brought out practical facts about Bang disease and gave a plan for handling this important disease.

On the evening of January 14, a banquet was held in the University of Tennessee Cafeteria, and was attended by about 100 veterinarians and their wives. It was presided over in a superb manner by Dr. W. B. Lincoln, Morristown. Commissioner Fitts discussed the relation of the State Department of Agriculture to the veterinary profession. He asked for the cooperation and support of all veterinarians and said his department desired to help the veterinarian. He said his department has adopted a rigid policy in which they proposed to handle only regulatory

work and would leave all educational and research work to the University. He said they expected the veterinary practitioner to render advice and service to all owners with sick animals. Prof. C. A. Keffer, Director of Extension, outlined the work of that service, saying that it was entirely educational.

Dr. H. A. Morgan, president of the University of Tennessee, chose for his subject "The Relation of the University to the Veterinary Profession." He expressed a deep appreciation of the veterinary profession for its great contribution to the welfare of the State, saying that no other group, in his opinion, was rendering greater service to the people of the State and nation. He stated that his appreciation of the veterinary profession began when he was being educated in the University of Toronto, where he came under the influence of Dr. F. C. Grenside, a fine veterinarian and a scholar. From Canada, Dr. Morgan went to Louisiana, where he became associated with Dr. W. H. Dalrymple. Dr. Morgan said that Dr. Dalrymple was a man, who, in his opinion, made the greatest contribution to the welfare of the State and the South of his time.

Then, Dr. Morgan said, he came to Tennessee, where he found Dr. M. Jacob, who, he said, was giving the same unselfish and devoted labor, and who was making as great a contribution to the welfare of the State as anyone in the University. He said that the greatness of each one of these three men was in the loyalty and devotion to their profession, resulting in great service to mankind. Dr. Morgan gave a very forceful address and showed a profound knowledge of the veterinary profession and its opportunities for service to mankind. The addresses of the evening were interspersed with piano and violin selections, together with singing and some Smoky Mountain folk songs. The banquet was a high point of the meeting and much enjoyed by all present.

The program the second day began with "A Discussion of the Intestinal Parasites of Dogs," by Dr. Stubbs. Dr. W. M. Bell, Nashville, gave his experiences with bovine hemorrhagic septicemia. He called attention to the fact that the use of aggressin of equine origin will sensitize against a subsequent horse-serum injection.

Dr. P. W. Allen explained "The Agglutination Test for Bang Abortion Disease from a Laboratory Standpoint." He discussed the various tests and their application. Dr. H. H. Adair gave some very interesting experiences with "Unusual Cases in Cattle

Practice." Dr. J. M. Jones, State Veterinarian, presented a paper on "Live Stock Sanitary Control Work in Tennessee," and Dr. J. W. Berry discussed "Experiences in Sheep Practice."

The meeting was a very successful one and the members of this Association form a hospitable and an admirable group, loyal to the profession and showing a splendid spirit of cooperation for service to the live stock industry.

E. L. STUBBS, *Reporter.*

MARYLAND STATE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Maryland State Veterinary Medical Association was held at Medical Hall, Baltimore, January 16, 1930, with about seventy members and guests present.

The meeting was called to order by the President, Dr. John P. Turner, of Washington, D. C. The presidential address summed up the veterinary situation in the country today. Attention was called to the statement of Dr. Raymond A. Pearson, president of the University of Maryland, to the effect that veterinary medicine is the keystone of agriculture. The investigators and practitioners are doing their part in caring for this responsibility. The veterinary schools all report increased enrollments. This year the American schools recorded an attendance of 1,089. This is almost double the attendance (583) reached in the low year, 1925-26.

The scope of the work of the veterinarian is also expanding rapidly. He is now considered the proper man to direct the inspection of food products of animal origin. In sanitary work, he is being sought by cities in the milk control service. Hundreds of counties are employing veterinarians in the control of animal diseases. So great has been this demand for official veterinarians that many sections are now without veterinary service. However, the law of supply and demand still obtains to a greater or less degree, and a good stock country that will properly support a veterinarian can still usually obtain one.

During the year much attention has been given to the study of Bang disease and its relation to public health. There seems to be substantial evidence that undulant fever in man is sometimes milk-borne, but that apparently milk is not the usual source of infection. The disease has been reported in 46 of the 48 states. It is most often met with in packing-house employes and next in

farmers. It is of interest to know that during the past year the Bang organism has been isolated from chickens and horses, and our own laboratory has found this bacillus in the pus of a case of fistulous withers.

Inspection of diseased poultry by the U. S. Department of Agriculture is now being carried on in sixteen packing-plants. Dr. Benjamin Schwartz, of the U. S. Bureau of Animal Industry, has found that lung worms of hogs may be transmitted through earthworms. Chicken-pox has also been transmitted mechanically by mosquitoes.

The Publicity Committee was congratulated on its maiden effort in bringing before the Association the matter of the State taking over the tuberculin-testing of accredited herds. This movement to give more free veterinary service will probably win out. It has already won in New Jersey, Connecticut and New York. Dr. Turner stated that the Chair did not presume to advise what to do. It could only point out the facts.

The second paper was entitled, "Atypical Cases of Parturient Paresis," delivered by Dr. R. V. Smith, of Frederick. The author stated that all milk fever cases should be considered as emergency calls and the animals should be given attention at the earliest time possible. The most constant symptom in the atypical case seems to be a subnormal temperature. The disease has only rarely been encountered in cows with the first calf. It is quite often seen long after parturition. Numerous cases are also noted in heavy springers being unloaded for water and feed while being shipped long distances. A relatively common complication is prolapse of the uterus. In these cases the udder should be inflated before returning the uterus. The old treatment of inflation seems to be still producing the best results.

The third paper was entitled, "The Horse in the Army," and was presented by Major G. H. Koon, Commandant, Army Veterinary School, Army Medical Center, Washington, D. C.*

The fourth paper was entitled, "Hemorrhagic Septicemia—Diagnosis and Treatment of True and Suspected Cases," and was delivered by Dr. C. J. Marshall, of the University of Pennsylvania. The author pointed out that considerable confusion and diversity of opinion exists regarding the diagnosis of this disease. It may be mistaken clinically for anthrax, blackleg, corn-stalk disease, bracken poisoning, damaged sweet clover poisoning,

*To be published in the JOURNAL.

malignant catarrhal fever, stockyards pneumonia, shipping fever, septic pleuro-pneumonia in calves and others.

Many of the diseases may be eliminated by the histories of the cases. A laboratory examination should be obtained whenever possible. In this connection, the practitioners can assist the laboratory greatly by selecting the proper pathological specimens and again by shipping them promptly and properly. Lesions wherever located furnish the best laboratory specimens. They should be removed with all possible aseptic precautions, packed in nonbreakable, hermetically sealed containers and transferred promptly to the laboratory. The history and symptoms of the case should be furnished the laboratory.

Most cases of hemorrhagic septicemia are found in cattle that have been recently shipped. It is not practical to make a true differential diagnosis between shipping fever, stockyards pneumonia and hemorrhagic septicemia in the beginning of these diseases, and, as most of the principles of treatment are applicable to each, they will be considered collectively.

The animals should be carefully examined before and during shipment. Those that are sick should not be shipped, and those that become sick in transit should be unloaded as soon as possible. They should be rested, properly fed before, during and after the journey. The cars should not be over-crowded.

It appears strange that hemorrhagic septicemia aggressin and serum should prove so satisfactory in treating influenza and pneumonia in horses and shipping fever and stockyards pneumonia in cattle, unless the bipolar bacillus plays some part in these cases. In handling long shipments of cattle during extreme weather conditions, losses can be materially reduced by artificial immunization before shipment. The ideal plan is to give the aggressin about two weeks before shipment. When shipment must be made within the two weeks, it appears best to give the serum. If any of the members of the shipment show a rise in temperature within two weeks after reaching destination, a large dose of serum should be given and repeated as occasion requires. In case it is desired to produce a more permanent immunity, aggressin should be given when the animals are well and accustomed to their new quarters. Aggressins are not recommended as curative agents. It is necessary to avoid anaphylaxis, when aggressins or serums are given on more than one occasion, by using hemologous products.

The usual form of medical treatment and care should be employed in pneumonia whether serum is used or not. Stimulants internally and counter-irritants to the lungs are believed to be useful. When pneumonia occurs in heavy springers termination is usually fatal in spite of any form of treatment.

The last paper on the program was entitled, "Bang Disease," and was given by Dr. M. F. Barnes, Pennsylvania Bureau of Animal Industry, Harrisburg, Pa. The author stated that this, as a specific disease, has been studied for about thirty-one years. During this time research has established many facts, yet, generally speaking, the progress has been slow. The agglutination test has been used since 1909, probably first by Stockman and M'Fadyean and first in this country by Lawson, Schroeder and Cotton, in 1911, who reported that milk from several herds injected into guinea pigs produced lesions somewhat similar to those of tuberculosis. Mohler and Traum identified this organism as the Bang bacillus. At the suggestion of Eichhorn, Alice Evans, in 1918, showed that the Bang disease organism is closely related to the organism of swine abortion and the organism causing Malta fever in goats and undulant fever in man.

After the disease is introduced into a herd, the usual system of herd management tends to keep it active rather than to eliminate the infection. The proper herd management should contain a system of disease prevention with principles for keeping the cause of disease and susceptible animals apart. The chief disseminators of Bang disease are: the infected cow at the time of aborting or calving, and a short period before and after, through contaminated discharges and the afterbirth; the infected bull through service; the carrier cow through milk; the young calf through infected milk and feces; the users of living-culture vaccines; the barnyard manure pile; and the herdsman through careless practices.

The herd symptoms or manifestations are best described as the occurrence of abortions and sterility; occasionally acute rheumatic attacks with stiffness and elevation of body temperature; occasionally a bull with swollen scrotum, testicle and spermatic cord; more udder troubles than usual—mastitis or garget; more than the usual number of big knees; reduction in the amount of milk produced by the herd; scarcity of calves in the calving season, and a general herd inefficiency.

In Pennsylvania, testing has been done in over 3,000 herds; more than 1,000 are operating under the "Pennsylvania Plan,"

and 270 certificates have been issued. A few certificates have not been renewed because breeders have gone out of the business and, in a few instances, for other reasons having no relation to the efficiency of the method. Only four certificates have been revoked and in each case this was due to failure to comply with certain requirements of the plan.

The Philadelphia Board of Health recently passed a resolution requiring that on and after March 1, 1930, all inspected raw milk sold in the city shall come from blood-tested cattle in accordance with the Pennsylvania Plan, which shall include blood-testing and the elimination of reactors. It is only a question of time until municipalities throughout the country will require that all raw milk shall come from Bang-disease-free herds.

At the business meeting, the officers elected for the ensuing year were: President, Dr. Hulbert Young, Baltimore; vice-president, Dr. W. E. Campbell, Bel Air; secretary-treasurer, Dr. E. M. Pickens, College Park; member of the Executive Board, Dr. J. P. Turner, Washington, D. C.

E. M. PICKENS, *Secretary-Treasurer.*

MINNESOTA STATE VETERINARY MEDICAL SOCIETY

The thirty-third annual meeting of the Minnesota State Veterinary Medical Society was held in the Roof Garden of Hotel St. Paul, St. Paul, January 16-17, 1930.

The first session was called to order by President Harry Evenson, of Sacred Heart. In his address President Evenson said in part:

> Practice of veterinary medicine, like all other professions and business, has in the past few years encountered changes; and, were not the practitioner to conform with such changes in his routine of activities, a reflection on the profession, as a whole, would be the result.
>
> Veterinary laws, as enacted several years ago, have well served their purpose for the time, but their application today, with our changed conditions, either makes such laws worthless, or we veterinarians lack the power necessary in demanding their execution.
>
> In most states, there has existed for some time, a veterinary practice act, which clearly defines that any person who shall diagnose, prescribe and treat diseases of live stock shall be a graduate of a recognized veterinary college and that he shall have satisfied a board of examiners in such state of his qualifications to so act.
>
> Regardless of these laws, we have with us today, men without such training, no thought given to their qualifications, who do so act, and in defiance of such state laws, they boldly make use of the columns of newspapers in advertising their ability in curbing disease of all live stock.

The report of the Secretary showed that the Association has a membership of 234 active and 10 honorary members.

The Treasurer's report showed a comfortable balance in the treasury.

Eight new members were elected to active membership. On recommendation of the Board of Trustees, Dr. G. E. Totten, B. A. I. Inspector-in-Charge, South St. Paul, was elected to honorary membership.

Dr. C. E. Cotton presented the report of the Committee on Infectious Diseases. Dr. H. C. H. Kernkamp, of University Farm, presented the report of the Committee on Bacteriology. The report of the Committee on Colleges was read by the Secretary, in the absence of the chairman, Dr. R. A. Merrill, of Clara City. Dr. C. S. Shore, of Lake City, presented the report of the Committee on Surgery. Dr. C. F. Schlotthauer, of Rochester, presented the one on Medicine. Dr. W. L. Boyd presented the report of the Committee on Stallion Registration. Dr. P. A. Carter, of the State Board of Health, presented the report of the Committee on Milk Inspection. Dr. C. P. Fitch, made a short report for the Committee on the Relation of the Society to the A. V. M. A. A very important report was presented by Dr. J. N. Campbell, of Truman, on "Practice and Ethics."

The following officers were elected for the ensuing year: President, Dr. J. X. Parent, Foley; 1st vice-president, Dr. D. B. Palmer, Minneapolis; 2nd vice-president, Dr. A. C. Spannaus, Waconia; secretary-treasurer, Dr. C. P. Fitch, St. Paul; member of Board of Trustees (three-year term), Dr. C. L. Tompkins, Ivanhoe.

Dr. J. A. Campbell, practitioner, Toronto, Canada, presented a very interesting discussion on "Obstetrics in Small Animals." Dr. Campbell illustrated his remarks by models and showed instruments that he used in his extensive canine practice. Dr. Campbell's paper was listened to with great interest by the membership and a lengthy discussion ensued following his remarks.

Dr. Campbell's discussion was followed by one by Dr. T. A. Sigler, Greencastle, Ind., on "Modern Methods in Horse Practice." Dr. Sigler is very popular with the veterinarians of Minnesota and his common sense and practical methods were most favorably received. Horse practice is still a considerable part of the work of many of the country practitioners of Minnesota.

The banquet was held in the Palm Room of Hotel St. Paul, during the evening. An excellent meal was served and entertainment provided. It was interesting to watch the expressions

on the faces of some of the veterinarians, when the magician took their ten dollar bills and tore them in half. They got them back, however. The speakers at the banquet were Dr. A. V. Hardy, of the U. S. Public Health Service, who spoke on "The Undulant Fever Problem," and Dr. H. E. Moskey, of the Food, Drug and Insecticide Administration, U. S. Department of Agriculture, who spoke on "So-Called Veterinary Remedies and Their Control." Both speakers presented their subjects in a clear and a concise way which merited much favorable comment among those present.

The sessions on Friday were held in the Roof Garden, as on the previous day. The first paper was by Dr. H. C. H. Kernkamp on "Anemia in Young Pigs: A New and Important Disease in Minnesota." This is an important disease in Minnesota. Dr. Kernkamp presented the available data on the condition and told the practitioners how to recognize it, in the field.

This paper was followed by a discussion on abortion, or Bang's disease in Minnesota, by Dr. L. S. Englerth. Dr. Englerth is in charge of Bang's disease control work of the Live Stock Sanitary Board, in Minnesota. He presented data to show how the disease is being controlled in the state-owned herds and in herds belonging to private individuals.

The final speaker was Dr. H. E. Treman, of Rockwell Center, Iowa. He spoke on "Simple Operations of Great Value to the Practitioner." Dr. Treman illustrated his remarks with many specimens and showed the veterinarians how he conducted many forms of technic in his actual practice. The veterinarians were intensely interested in Dr. Treman's presentation and the discussion lasted long past the noon hour.

The first paper in the afternoon session was by Dr. Adolph Eichhorn, of the Lederle Laboratories, Pearl River, N. Y., on "Recent Advances in Immunization Against Dog Distemper." Dr. Eichhorn spoke of his experiences in England, observing the work of Dr. Laidlaw and Major Dunkin. Dr. Eichhorn expressed as his opinion that the method of immunization devised by the English veterinarians would prove successful in combating dog distemper in the United States.

"The Significance of Low Dilution Reactions for Abortion Disease in Infected Herds" was presented by Dr. C. F. Schlotthauer and Dr. F. D. McKenney, of the Mayo Clinic, Rochester. In this presentation, they showed charts indicating that animals

with low dilution titres, oftentimes following, become positive reactors and are dangerous animals to leave in the herd.

Dr. John McKay, of Duluth, presented a discussion on "Incidents That May Happen in Everyday Practice to the Average Veterinarian." Dr. McKay mentioned a number of cases occurring in his practice that were of great interest. He described them in detail and a great deal of discussion took place. Dr. McKay spoke particularly in regard to the diseases of reindeer that occur in these animals, when raised in the United States. He stated that literature on this subject was practically nil.

The final paper was presented by Dr. B. J. Lattimer, Springfield, on "Hog Cholera and Its Breaks from Vaccination." Dr. Lattimer has had a wide experience in hog cholera vaccination and the results attending it and his experiences have been, in general, very good. He attributes a great deal of his success to the careful examination of the hogs before vaccination and the liberal use of hog cholera serum.

This was one of the largest winter meetings the State Association has ever had. One hundred and sixty were registered during the two days.

C. P. Fitch, *Secretary.*

SOUTH DAKOTA VETERINARY MEDICAL ASSOCIATION

The annual meeting of the South Dakota State Veterinary Medical Association was held in Sioux Falls, January 16-17, 1930. Headquarters were at the Cataract Hotel.

The visiting veterinarians were welcomed to Sioux Falls by Mr. Ira A. Moore, president of the Chamber of Commerce. In his address Mr. Moore offered the assistance of his organization to the veterinarians to make their meeting more pleasant. Dr. G. P. McCue, of Aberdeen, president of the Association, responded to Mr. Moore's address of welcome. He urged veterinarians to strive continually for higher standards and greater proficiency in their professional work.

Dr. Harry J. McCauley, of Beresford, gave a case report on sweet-clover poisoning. Dr. Edward A. Cahill, of Chicago, Ill., gave a very interesting talk on hog cholera, post-vaccination trouble, and veterinarians' problems in general.

Mr. T. O. Ronayne, Director, Division of State Inspection, Pierre, was unable to be present and his place on the program

was taken by Mr. Layle, who assured the Association that the veterinarians would have the full cooperation of the Department in regard to the enforcement of laws governing the manufacture and sale of the so-called "cure-all remedies" that are offered for sale so profusely throughout the State.

Dr. H. J. Classick, of Hurley, gave a case report on coccidiosis in Western feeding lambs, which was followed by a very interesting discussion.

On the evening of the first day, an elaborate and beautifully appointed banquet was served, in the Ball Room of the Cataract Hotel, to the veterinarians and their wives, who were delightfully entertained by local celebrities with song and music. Dr. G. P. McCue acted as toastmaster. The local committee in charge of the affair received much praise for providing such an enjoyable occasion. The banquet was furnished by the different serum and biological houses of this territory.

Dr. Frank Breed, of Lincoln, Nebr., presented a motion-picture on rabies in both man and animals. The picture was very interesting and instructive. Dr. Breed also gave a paper on "General Diseases of Poultry."

Friday morning the meeting was opened with a demonstration of the agglutination test for contagious abortion, conducted by Dr. L. E. Willey, of Sioux City, Iowa. Dr. Floyd Cross, of the Colorado Agricultural College, gave an interesting lecture and illustrations of the common diseases of sheep. The members of the Association considered it a great privilege to be able to hear such a lecture.

Hon. Frank D. Kriebs, secretary of the State Department of Agriculture, Pierre, talked briefly on the dairying problems of the State and encouraged the veterinarians to talk "Plant more trees" in their respective communities. Dr. E. E. Burdick, of Huron, wrote a paper on "Pitfalls of Anti-Hog Cholera Vaccination," which was most interesting. Dr. Burdick was unable to be present but his paper, which contained a wealth of information, was read by the Secretary.

Dr. A. T. Peters, of Peoria, Ill., gave a talk on "Feeds and Feeding," which was very well received by the members and which was followed by an interesting discussion. Dr. T. H. Kindred, of Sioux Falls, gave a short talk on "Animal Rabies and Its Control." He gave the results of some experiments and answered many questions on administering first aid.

The following officers were elected for the ensuing year: President, Dr. H. J. Classick, of Hurley; vice-president, Dr. L. E. Eggleston, of Alcester; secretary-treasurer, Dr. Geo. E. Melody, of Hoven.

It was the unanimous opinion of those present that this meeting was one of the best in the history of the Association. About one hundred members were in attendance. The ladies were nicely taken care of with a luncheon and theatre parties, sponsored by the commercial houses.

GEO. E. MELODY, *Secretary-Treasurer.*

STATE VETERINARY MEDICAL ASSOCIATION OF TEXAS

In their seventh semi-annual meeting held at Waco, January 16-17, the members of the State Veterinary Medical Association of Texas realized one of their most beneficial and enjoyable conferences. Along with the seventy-eight members there were good-will listeners, friends and representatives of many public-spirited organizations present. With the Mayor and the local veterinarians turning over the key to the City, together with other safeguards, there was nothing to mar the meeting.

The several sessions of the meeting were held in the Ball Room of the Rawleigh Hotel, with the President, Dr. W. R. Hodges, of Ranger, presiding. Rev. Arthur Stout, of the Central Christian Church, in delivering the invocation, lifted all his hearers above the mundane and petty affairs of life into a spirit that lasted through the meeting. Mayor T. D. Brooks welcomed the visiting veterinarians in the name of the City. Dr. N. F. Williams, State Veterinarian, Fort Worth, made the response. Mayor Brooks said that the holding of so many conventions in Waco and elsewhere was a significant sign of the progress of the times in scientific fields, as well as in all other lines of human endeavor. He said that it showed that the pooling of scientific discoveries was for the common good and high purposes. Dr. Williams praised experimental and research work and declared that the time has come when the many depend on the brains of the few. He said further that the problems of live stock and sanitation must go hand in hand for solution.

Of special interest and importance was the presentation of rabies problems by Dr. C. E. Salsbery, of Kansas City, who discussed this prevalent disease as it appears in both animals and man.

Another outstanding discussion was that on anaplasmosis in cattle which, in some respects, is closely analogous to Texas fever. However, proof is lacking that anaplasmosis is transmitted by the tick. While found in some localities of Texas, it is most prevalent in several states north of the Texas fever quarantine line. The subject was presented by Dr. Geo. W. Stiles, of the U. S. Bureau of Animal Industry, who is conducting a special investigation of the disease. Dr. Stiles also incidentally mentioned psittacosis and predicted that it may become a serious problem.

Dr. A. T. Kinsley, of Kansas City, made a statement to the effect that losses to the cattle industry through the ravages of contagious abortion amount to $175,000,000 annually and in a single state this disease has been responsible for losses totaling $3,500,000 in one year. Dr. Kinsley went on to say that contagious abortion is the most expensive malady existing among live stock in the United States today. He also discussed the relation of the disease to public health.

Dr. T. O. Booth, of Temple, presented a paper on drawing blood samples from the jugular vein, as well as the proper technic for intravenous medication. Considerable discussion followed, bearing on points in connection with the proper technic, as well as the sterilization of needles.

Dr. J. S. Watson, of Mexia, discussed mastitis. In the way of treatment he recommended formaldehyd internally and bacterins subcutaneously. He reported that he had used, as a heroic measure, doses as large as 35 cc.

The last paper of the first day was presented by Dr. W. R. Sanderson, of Brownwood, in which he described his technic for injecting anesthetics into the spinal canal for operations on the posterior quarters of animals.

Cattle practice was discussed by Dr. M. E. Gleason, of San Antonio; Dr. T. O. Booth, of Temple; and Dr. Verne Scott, of Stephenville. The meeting ended with a clinic conducted by Dr. W. G. Brook, Dr. R. A. Self and Dr. Virgil Fondren, at the Scott and Christian Hospital.

The weather was bad but it did not daunt the men of Texas nor their wives, as about twenty accompanied them. A good meeting of the Women's Auxiliary was held in conjunction with the Association meeting. The President, Mrs. W. R. Sanderson, of Brownwood, presided. Several new members were added to the roll. The President stressed the importance of the Auxiliary as an educational factor in the home life of the members of the

profession, as well as their patrons. The local entertainment committee left nothing undone to make the meeting a memorable one and the visitors were generous with their words of appreciation and thanks.

D. PEARCE, *Secretary.*

Kidney Worm an Expensive Pest

Hog-producers, especially in the South, lose millions of dollars each year from depredations of the swine kidney worm. The kidney worm causes abscesses and scar tissue in the kidney, kidney fat, lungs, liver, pancreas, and parts of the muscular tissue of swine. The injuries not only interfere with growth and development of pigs, but result also in extensive condemnations of these parts of the carcass on postmortem examination in meat-packing establishments. The pest lives for a part of its life cycle in the soil, so infestation may be prevented to a considerable degree by having the pigs farrowed in clean pens and raising them on clean soil.

The parasite may affect swine of all ages and is spread by eggs voided by infected animals. The eggs hatch in the soil and the young worms are picked up by young pigs or by mature hogs. Control measures, therefore, in part consist of sanitary methods of management, such as keeping new pigs in clean fields which are high and well drained and have not been pastured by swine for at least a year, or in fields which have been plowed and are growing a cultivated crop.

Another aid in controlling the pest is the use of sanitary watering equipment and self-feeders in creep pens during the suckling period. These practical devices enable the pigs to escape much of the infection that may be spread by infected sows. Properly balanced rations, which include a mineral mixture of tankage, salt and ground limestone, promote rapid growth and early maturity. Control measures strike at the weak points of the life cycle of the parasite and are the most effective methods of preventing losses from kidney worms, according to investigators in the U. S. Bureau of Animal Industry.

Dr. John F. Rankin, of Astoria, Oregon, has been appointed chairman of the Section on General Practice, by President Ferguson.

NECROLOGY

J. R. FICKLE

Dr. J. R. Fickle, of Michigantown, Indiana, died at his home, January 25, 1930, of pneumonia, which followed an attack of influenza. He was in his 48th year. He was ill about one week. Dr. Fickle was born near Frankfort, Ind., and had practiced at Michigantown for about twelve years. He was a graduate of the Indiana Veterinary College, class of 1916.

He is survived by his mother and one son. His wife preceded him in death three weeks previously.

THOMAS S. CARLISLE

Dr. Thomas S. Carlisle, of Chestnut Hill, Philadelphia, Pa., died at his home, February 8, 1930, at the age of 67 years. He was a graduate of the University of Pennsylvania, class of 1901, and practiced at Chestnut Hill continuously from the time of his graduation until his death. Five daughters survive him.

Dr. Carlisle held membership in the A. V. M. A. from 1903 until 1916.

CHARLES A. McKIM

Dr. Charles A. McKim, of Windsor, Colo., passed away at his home, February 13, 1930, after an illness of about three months. The cause of death was reported as heart trouble. Dr. McKim was a graduate of the Chicago Veterinary College, class of 1899. He joined the A. V. M. A. in 1903, at which time he was state veterinarian of Nebraska and located in Lincoln. Later he engaged in general practice at Norfolk, Nebr. He removed to Windsor, Colo., about 1917. The deceased is survived by his widow and one son.

PAUL B. GIACHETTO

Dr. Paul B. Giachetto, of Utica, Illinois, died at St. Mary's Hospital, La Salle, February 20, 1930, after an illness of several days, ascribed to encephalitis.

Born in Coal City, Ill., August 15, 1895, Dr. Giachetto attended the McKillip Veterinary College. He was graduated in 1920. For the past five years he had conducted a general practice at Utica. He served in the Army during the late war. Surviving him are his widow, one daughter, his parents and two brothers.

THOMAS H. EDWARDS

Dr. Thomas H. Edwards, of Pasadena, Calif., passed away on March 2, 1930, after an illness dating back as far as 1917. The true nature of the ailment was never correctly diagnosed, as revealed by an autopsy which disclosed a carcinomatosis involving the lungs, liver, spleen and pancreas.

After pursuing an arts course for two years, Dr. Edwards decided to study veterinary medicine and entered the Kansas City Veterinary College. He was graduated in 1909 and for several years was in the service of the U. S. Bureau of Animal Industry. He then entered the Army and was sent to the Philippines. During the late war he was advanced to the rank of captain. He left the service on December 15, 1922, and returned to civil life. He enlisted in the Reserve Corps and received a commission of major. He took postgraduate work at the University of Pennsylvania Veterinary School in 1923, and later was in charge of rabies control for the Los Angeles County Health Department. In the latter part of 1924, Dr. Edwards was placed in charge of rat control for Los Angeles County, in connection with plague eradication work. He continued in this work until April 1, 1925, when the appropriation was exhausted.

Dr. Edwards next entered private practice at Compton, Calif. On June 15, 1925, he accepted an appointment with the State Meat Inspection Service and was stationed at Salinas, where he remained until November 1, when he re-entered practice at Compton. Several months later Dr. Edwards fell and broke an arm. This incapacitated him for practice, so he applied for reinstatement in the B. A. I. On March 22, 1926, he was reappointed to the service and assigned to meat inspection at the Carstens Packing Company plant at Tacoma, Wash. In Sep-

tember he resigned and returned to California, locating at Pasadena, with the intention of going into private practice, but he accepted a position as meat inspector for the Los Angeles City Health Department. After spending two years in this work he removed to El Paso, Texas, believing the climate there would be better for him. He accepted an appointment as City Meat Inspector in El Paso, March 1, 1929. In July he was taken sick again and was obliged to return to California. He entered the U. S. Naval Hospital, at San Diego, where a diagnosis of pneumococcic septicemia was made.

Dr. Edwards joined the A. V. M. A. in 1918 and was a member of the Committee on History (1922-23). He is survived by his widow.

ROBERT S. FOSTER

Dr. Robert Sanderson Foster died at his home in Portland, Oregon, March 3, 1930. He had been in very poor health for about six months. About two and one-half years ago he was in an automobile accident and seriously injured, losing an eye at that time.

Born at Bathgate, N. D., April 7, 1895, his early boyhood was spent in the Middle West. In 1917 he enlisted in the infantry (Company C), at Bathgate, and served overseas until honorably discharged in 1918. He entered the Ontario Veterinary College and was graduated (B. V. Sc.) in 1922. As a student he was active in athletics and won numerous medals as a result of his prowess on the field and track.

Following his graduation, Dr. Foster located in Portland and associated himself with Dr. Otto Ruehle in practice. He joined the A. V. M. A. in 1925. He was a member of the Oregon State Veterinary Medical Association and the Multonomah County Veterinary Medical Association. He was a Mason and a member of the American Legion.

Dr. Foster is survived by his widow, one daughter, his mother one sister and two brothers. He was laid to rest in the Lincoln Memorial Park Mausoleum, under Masonic auspices, with Portland veterinarians acting as pallbearers.

JAMES G. FERNEYHOUGH

Dr. James G. Ferneyhough died suddenly on his farm in Chesterfield County, Virginia, near Richmond, March 4, 1930. He was in his 57th year. His death was entirely unexpected, as he

had been active and apparently in good health up to the last few hours of his life. He had gone for a walk around the farm and, when he did not return to the house for supper, a search was started and the body was found in the cow pasture. Death was ascribed to angina pectoris.

After receiving his early education at the Virginia Polytechnic Institute, at Blacksburg, Dr. Ferneyhough attended the United States College of Veterinary Surgeons in Washington and was graduated in 1899. He returned to the Blacksburg institution and taught there for five years. He was then appointed State Veterinarian and retained this position, through one administration after another, for about twenty years.

Dr. Ferneyhough was very much in the limelight a few years ago, as a result of his condemnation for tuberculosis of two heifers belonging to Senator Carter Glass, of Virginia. "The Tale of Two Heifers" is well known to most veterinarians and ultimately led to Dr. Ferneyhough's loss of the position of State Veterinarian. Recently he was an active aspirant for the office of State Commissioner of Agriculture. Upon failing to receive this appointment, he announced his intention of entering the Democratic primaries this summer, in opposition to Senator Glass, to obtain the nomination for U. S. Senator.

Dr. Ferneyhough joined the A. V. M. A. in 1912. He was a member of the United States Live Stock Sanitary Association, the Southeastern States Veterinary Medical Association and the Virginia State Veterinary Medical Association. About two years ago he was appointed to the governing board of the Virginia Polytechnic Institute by Governor Byrd.

Surviving Dr. Ferneyhough are his widow, three sons and one daughter.

JAMES ROBERTSON

Dr. James Robertson, of Chicago, Illinois, died at his home, February 24, 1930, at the age of 70. For many years Dr. Robertson was professor of dental surgery at the Chicago Veterinary College, of which institution he was a graduate (1892), in addition to conducting a large private practice in Chicago. In 1898 he was appointed a member of the Illinois Board of Veterinary Medical Examiners, a post he held for many years.

Dr. Robertson joined the A. V. M. A. in 1893. In 1909, when the Association met in Chicago, he served as secretary of the Local Committee on Arrangements. At the same meeting he

was elected a vice-president. He served as a member of the Committee on Legislation from 1911 until 1916. He was a member of the Illinois State Veterinary Medical Association and the Chicago Veterinary Society. He had served as president of the latter organization.

CHARLES R. TREADWAY

Dr. Charles Robert Treadway died at his home in Kansas City, Mo., March 16, 1930, after an illness of about two years.

Born in Martin City, Mo., Dr. Treadway came to Kansas City as a small boy. In 1898 he joined the Kansas City Fire Department and while thus employed became interested in veterinary medicine. He entered the Kansas City Veterinary College and was graduated in 1905. The same year he was appointed veterinarian to the Fire Department and continued in this position until 1917. Later he became veterinarian for the American Railway Express Company. From 1924 to 1926 he was Commissioner of Street Cleaning. In 1926 he opened a small-animal hospital at his home and continued to practice until his fatal illness.

Dr. Treadway joined the A. V. M. A. in 1909. He was a Mason and a member of several other fraternal organizations. He is survived by his widow, one son, one daughter, three sisters and a brother.

PERSONALS

MARRIAGE

Dr. R. B. Booth (Corn. '27) to Miss Jean Griffith, both of Jamaica, N. Y., March 16, 1930, at Jamaica, N. Y.

BIRTHS

To Dr. and Mrs. J. R. Porteus, of Smyrna, Del., a son, James Oliver, October 25, 1929.

To Dr. and Mrs. J. F. Shigley, of State College, Pa., a daughter, Ann Elizabeth, December 30, 1929.

To Dr. and Mrs. Harvey L. Fell, of Wilmington, Delaware, a son, Harvey L., Jr., January 19, 1930.

To Dr. and Mrs. C. H. Betty, of Mattoon, Ill., a son, Jerome Dale, January 30, 1930.

To Dr. and Mrs. H. M. LeGard, of Weston, Ont., a son, Alfred John, February 27, 1930.

To Dr. and Mrs. Lloyd C. Moss, of Honolulu, Hawaii, a daughter, Margaret Jean, February 20, 1930.

PERSONALS

Dr. R. G. Little (U. P. '26), formerly of Williamsport, Pa., is now located in Oxford, N. Y.

Dr. J. F. Woods (Ont. '13) was elected Reeve of Matsqui Municipality, B. C., in January.

Dr. Wright J. Smith (Amer. '95), of Kingston, N. Y., has been elected Sheriff of Ulster County.

Dr. E. L. Baker (Chi. '09) has located at 610 Lincoln Way East, La Porte, Ind., for general practice.

Dr. William Caslick (Corn. '27), formerly located at Whitehall, N. Y., is now at Gouverneur, N. Y.

Dr. E. M. Alderman (K. C. V. C. '14), formerly of Jackson, Miss., is now located in Yazoo City, Miss.

Dr. W. A. Browne (K. S. A. C. '28), of Cottonwood Falls, Kansas, has been appointed City Milk Inspector.

Dr. Guy L. O'Harra (K. C. V. C. '18) has requested a change of address from Cutler, Calif., to Newman, Calif.

Dr. J. W. Elliott (Ont. '90), of Aberdeen, S. Dak., lost his hospital and barn by fire on December 24 last.

Dr. Lloyd Donnell (Ind. '18), of Stockwell, Ind., has purchased the practice of the late Dr. J. R. Fickle, at Michigantown, Ind.

Dr. Langdon Frothingham (Harv. '89), of Boston, Mass., recently returned from a trip to the West Indies, where he went to "sun up."

Dr. H. B. F. Jervis (Ont. '04), formerly of Santa Monica, Calif., gives a new address: 1144 Westwood Blvd., West Los Angeles, Calif.

Dr. P. E. Johnson (Chi. '14), formerly of Pierre, S. Dak., has located at Britton, S. Dak., and is now devoting his entire time to general practice.

Dr. J. A. Winkler (Cin. '18), of Newport, Ky., has been appointed a member of the State Board of Veterinary Medical Examiners by Governor Sampson.

Dr. Ching-Sheng Lo (K. S. A. C. '23) is now connected with the Shanghai Bureau of Inspection and Testing of Commercial Commodities, Shanghai, China.

Dr. C. H. Betty (Mich. '26), of Mattoon, Ill., writes that his three-year-old son, Edward Paul, has fully recovered from an appendectomy which was performed recently.

Dr. J. P. Clark (K. C. V. C. '18) has removed from Stronghurst, Ill., to Keokuk, Iowa. He is now located at 829 Main St., and is engaged in general practice at that place.

Dr. Frank Collins (Chi. '08), of El Paso, Texas, recently returned from a 2½-months automobile tour through California, Florida and Cuba. Mrs. Collins accompanied him.

Drs. J. M. Bryan (A. P. I. '23) and E. W. Bryan (A. P. I. '16), of Birmingham, Ala., recently opened a new hospital with a capacity for 100 patients at 3222 Sixth Avenue, South.

Dr. Guy F. Hatchett (Ind. '22), of Chattanooga, Tenn., has been commissioned as a captain in the Tennessee National Guard and will be assigned to the medical detachment of the 109th Cavalry.

Dr. James A. Muffly (U. P. '29) has been transferred from the Walker-Gordon Laboratories at Plainsboro, N. J., to the Borden's Farm Products Company, Inc., with headquarters at Canaan, Conn.

Dr. S. S. Wertz (Chi. '09), of Kenesaw, Nebr., lost his office by fire on January 27, 1930. Dr. Wertz reports that his diploma from the Chicago Veterinary College was among the things lost in the fire.

Dr. Roy E. Willie (St. Jos. '22), of the U. S. Bureau of Agricultural Economics, formerly located at Swift & Co., Keokuk, Iowa, has been transferred to Chicago, Ill., and is residing at the Parkland Hotel, 1550 E. 63rd St.

Dr. E. H. Durr (A. P. I. '24) has resigned his position with the Mississippi Live Stock Sanitary Board and has begun work with the Hinds County Health Department as City Meat and Milk Inspector, with headquarters at Jackson, Miss.

Dr. N. L. Nelson (Iowa '11), of Ames, Iowa, was at no time connected with the American Veterinary Supply Company as stated in the February issue of the JOURNAL. The reference should have been to the Ames Veterinary Supply Company.

Dr. H. W. Feldwish (O. S. U. '13), who has been a field veterinarian with the State Department of Agriculture for the past two years, has removed from Columbus, Ohio, and located in Coshocton, Ohio, where he will conduct a general practice.

Dr. C. H. Clark (Ont. '90) assumed the duties of State Veterinarian of Michigan on March 15, following the resignation of Dr. B. J. Killham (McK. '12). Dr. Clark has been connected with the State Department of Agriculture for more than fifteen years.

Dr. Stanton Youngberg (O. S. U. '07) has been appointed Director of the Bureau of Animal Industry, following the reorganization of the Bureau of Agriculture, of the Department of Agriculture and Natural Resources of the Philippine Islands, on January 1.

Dr. E. A. Tunnicliff (K. S. A. C. '21), who has been at the Ranch Experiment Station, Sonora, Texas, for the last two years, has been appointed Assistant Veterinary Pathologist in the Veterinary Science Deparmtent, Montana Agricultural Experiment Station, Bozeman, Mont.

Dr. L. S. Englerth (K. C. V. C. '18), formerly of Royalton, Minn., has been assigned as Veterinarian-in-Charge of Bang Abortion Disease Control Work for the Minnesota Live Stock Sanitary Board, under the supervision of Dr. Charles E. Cotton (U. P. '93), secretary and executive officer of the Board.

Dr. Erwin Jungherr, who has been an assistant in the Veterinary Science Department, Montana Agricultural Experiment Station, for the past five years, has resigned and accepted a position at the Ranch Experiment Station, Sonora, Texas, where he will be engaged in the investigation of diseases of sheep and goats.

Dr. W. E. Russell (Chi. '20), late of North East, Pa., who has specialized in the silver fox for the last ten years, has recently been appointed Director of the Service Department of the Milligan and Morrison Fox Ranches. This Company operates and services over eighty associate ranches throughout Canada and the United States. Their parent ranch is located at Northam, Prince Edward Island, where they have installed an up-to-date laboratory and service bureau to take care of the health of over 10,000 breeding foxes.